European Science and Technology Observatory

Technical Report Series

Mapping Foresight Competence in Europe: The EUROFORE Pilot Project

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About the JRC-IPTS

The **Joint Research Centre** (JRC) is a Directorate General of the European Commission, staffed with approximately 2,100 people, coming in the vast majority from the 15 Member States of the European Union. The Brussels Support Services (including the office of the Director General and the Science Strategy Directorate) and seven Institutes located in five different countries compose the main organisational structure of the JRC (http//:www.jrc.org). The **mission of the JRC** is to provide customer-driven scientific and technical support for the conception, implementation and monitoring of EU policies.

The Institute for Prospective Technological Studies (IPTS) is one of the seven Institutes making up the JRC. It was established in Seville, Spain, in September 1994.

The **mission of IPTS** is to provide prospective techno-economic analyses in support of the European policy-making process. IPTS' prime objectives are to monitor and analyse science and technology developments, their cross-sectoral impact, and their inter-relationship with the socio-economic context and their implications for future policy development. IPTS operates through international networks, drawing on the expertise of the best high level scientific experts in Europe and beyond. It analyses the results of this scientific work and synthesises them into timely and policy relevant reports.

Most of the work undertaken by IPTS is in response to direct requests from (or takes the form of long-term policy support on behalf of) the European Commission Directorate Generals, or European Parliament Committees. IPTS sometimes also does work for Member States' governmental, academic or industrial organisations, though this represents a minor share of its total activities.

Although particular emphasis is placed on **key Science and Technology fields**, especially those that have a driving role and even the potential to reshape our society, important efforts are devoted to improving the understanding of the complex interactions between technology, economy and society. Indeed, the impact of technology on society and, conversely, the way technological development is driven by societal changes, are **highly relevant themes within the European decision-making context**.

The **inter-disciplinary prospective approach** adopted by the Institute is intended to provide European decision-makers with a deeper understanding of the emerging science and technology issues, and it complements the activities undertaken by other institutes of the Joint Research Centre.

The IPTS **approach** is to collect information about technological developments and their application in Europe and the world, analyse this information and transmit it in an accessible form to European decision-makers.

IPTS Staff is a mix of highly experienced engineers, scientists (life-, social- material- etc.) and economists. Cross-disciplinary experience is a necessary asset. The IPTS success is also based on its **networking capabilities and the quality of its networks** as enabling sources of relevant information. In fact, in addition to its own resources, IPTS makes use of external Advisory Groups and operates a number of formal or informal networks. The most important one is *the European Science and Technology Observatory (see below).* These networking activities enable IPTS to draw on a large pool of available expertise, while allowing a continuous process of external peer-review of the in-house activities.

About ESTO

http//esto.jrc.es

The European Science and Technology Observatory (ESTO) is a network of organisations operating as a virtual institute under the European Commission's – Joint Research Centre's (JRC's) Institute for Prospective Technological Studies (IPTS) - leadership and funding since 1997.

Today, ESTO is composed of a core of twenty European institutions, all with experience in the field of scientific and technological foresight, forecasting or assessment at the national level. These 20 organisations have a formal obligation towards the IPTS and are the nucleus of a far larger network of an additional 26 Affiliated and Associated Members. ESTO is an open network: membership is continuously reviewed and expanded with a view to match the evolving needs of the JRC-IPTS and to incorporate new competent organisations from both inside and outside of the EU 25+.
In line with the objective of supporting the JRC-IPTS work, ESTO **aims** at detecting, at an early stage, scientific or technological breakthroughs, trends and events of potential socio-economic importance, which may require action at a European decision-making level. The ESTO **core-competence** therefore lays in prospective trans-national analysis and advice on S&T changes relevant to EU society, economy and policy.

The **main customer** for these activities is the JRC-IPTS, and through it, the European policy-makers, in particular within the European Commission and Parliament. ESTO also recognises and addresses the role of a much wider community, such as policy-making circles in the Member States and decision-makers in both non-governmental organisations and industry.

ESTO members, therefore, **share the responsibility** of supplying IPTS with up-to-date and high quality scientific and technological information drawn from all over the world, facilitated by the network's broad presence and linkages, including access to relevant knowledge within the JRC' Institutes. The JRC-IPTS involvement in the elaboration and guidance of the ESTO tasks secures input, impartiality, quality and independence both to the process and its output.

Currently, ESTO is engaged in the following **main activities:**

- A series of **Specific Studies**. These studies usually consist in comparing the situation, practices and/or experiences in various member states, and can be of different kinds a) *Anticipation/Prospective analysis*, intended to act as a trigger for in-depth studies of European foresight nature, aiming at the identification and description of trends rather than static situations; b) *Direct support of policies in preparation* (ex-ante analysis); and c) *Direct support of policies in action* (ex-post analysis, anticipating future developments).
- Implementation of **Fast-Track** actions to provide quick responses to specific S&T assessment queries. On the other hand, they can precede or complement the above mentioned Specific Studies.
- ESTO exercises a "**Monitoring of Prospective S&T Activities in EU+"** and develops a "**S&T Alert/Early Warning**" function linked to a **"Research Road Mapping"** activity. These actions enable ESTO and JRC-IPTS especially to anticipate needs of European decision-makers.

Support the production of **"The IPTS Report"**, a monthly journal targeted at European policy-makers that contains articles on S&T developments likely to emerge on the policy-makers' agenda.

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Mapping Foresight Competence in Europe:
The EUROFORE Pilot Project

A joint
JRC/IPTS-ESTO Study

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Executive Summary

The last decade has seen a proliferation of Foresight exercises across Europe. Focused upon, among other things, science and technology, sustainable development, industrial competitiveness, and development of regional identity / cohesion, these exercises constitute new distributed fora in which futures are contested and policy and investment decisions emerge. Hundreds, sometimes thousands of people are involved in these exercises, and are drawn from a wide variety of backgrounds, often within the same exercise. These individuals are looking to anticipate future changes in their living and working environments. Such changes may be apparent from extrapolation of already discernible trends and drivers. They may also become apparent through the Foresight process, as knowledge of other actors' worldviews and future strategies come to be better understood. Through this increased strategic knowledge, participants in Foresight exercises hope to develop agility within an increasingly uncertain world. But this is only part of the picture, since Foresight is also 'active' in its future orientation, assuming that decisions taken today can be used to shape 'desirable' futures.

Interest in Foresight has become especially pronounced in the last ten years or so. With this growing interest has come demand for insights into Foresight 'good practice', particularly with regards to choosing appropriate methods for given situations. Amongst an emerging community of Foresight practitioners, policy makers, and academics, knowledge of many of the large national Foresight exercises, such as those carried out in Germany and the UK since the early 1990s is reasonably good, and useful lessons have been learnt from different national experiences. By comparison, knowledge of activities at other territorial levels, such as regions, is often very limited, as is knowledge of national activities that focus upon a small number of business sectors or socio-economic issues. There are some good reasons for this knowledge shortfall – many of these exercises are relatively parochial, with little or no international profile; many are conducted and written up in a language other than English, thus confining their diffusion mostly to within national borders; and up until now, no systematic attempt has been made to identify these activities, let alone describe and characterise them. This, therefore, was one of the major objectives of this ESTO project – to identify and characterise more than eighty Foresight exercises conducted in Europe over the last decade. By doing so, it is hoped that useful lessons can be drawn for future Foresight practice.

At the same time, it is widely recognised that the successful conduct of Foresight requires considerable skill and expertise. Prospective sponsors and practitioners new to Foresight are therefore extremely interested in knowing where existing Foresight competencies reside, since these offer pools of knowledge from which assistance and insights might be drawn. Moreover, given Foresight's projected role in the construction of the European Research Area (ERA), EC policy makers are also interested in learning more about where competencies reside. From what we know, those involved in organising and managing Foresight studies have tended to come from the futures and forecasting disciplines, from the planning profession, and from the technology assessment and research evaluation traditions, although in truth, such people could come from almost any background. Since Foresight skills are largely acquired through

practice, Foresight competencies tend to be recognised through the exercises that the practitioner has been involved with, rather than through any form of certification. This is important to bear in mind, since it points to the need to understand those Foresight exercises in which the practitioner has been involved. Only then can we make an assessment of the practitioner's competencies.

Against this background, the ESTO project has sought to map around eighty Foresight activities across the European Union (i.e. EU15) and a selection of five Candidate Countries. It was acknowledged from the outset that this number would represent only a fraction of Foresight activities conducted in Europe over the last decade. This was intentional, since we believe that any full-scale mapping should be preceded by a pilot study that 'tests' the appropriateness and robustness of the adopted approach.

As a first step, our pilot-mapping project necessitated the development of an indicator set that could capture the essence of a variety of Foresight activities (Section 2.2). The identification of suitable indicators was informed by the considerable experience of the project team, which consisted mostly of Foresight practitioners and academics. The information collected against these indicators was entered into a web-based database from the outset. The use of a relational database provided a structured platform for entering, analysing and viewing data, whilst the use of the web allowed data to be entered remotely across Europe and provides the basis for a searchable user interface (Section 2.4). Mapping of activities was conducted over a three-month period in 2002, and involved the project team making direct contact with the managers / organisers of the Foresight exercises to be mapped (Section 2.5). A number of boundary issues were resolved at the start of this mapping activity, so as to ensure that all project partners were doing similar things (Section 2.1).

In line with our belief that claims to competency should be underpinned by real Foresight experience, much project time and effort has been devoted to mapping Foresight exercises. However, we also spent some time mapping the experiences and skills of organisations and individuals as indicators of competence (Section 2.3). Time and budgetary constraints has meant that only around 30 organisations and individuals have been fully mapped, although more than 250 have an entry 'fiche' in the database for future mapping. But this was a sufficient number to 'test' the robustness of our competency indicators.

The pilot status of this project has meant that we have tried to be as critical and open-minded as possible on the approach taken. Thus, we devote a whole chapter of this report to methodological reflections, covering the appropriateness of our project boundaries, our indicator sets, and our data collection strategies (Chapter 3).

Of course, data collection covers only half of the task of mapping Foresight activities and competencies. Consideration must also be given to data presentation and analysis. The database is freely accessible on the web (http://les.man.ac.uk/eurofore) and can be searched using keyword and map search routines. But the database also offers the possibility of dataset analysis, for example, cross-tabulations of indicators. For the time being, we have conducted only some rudimentary analysis of the database, concentrating on frequency counts. Results are shown in Chapter 4. Through this basic analysis, we have indications of the most popular methods for the myriad of tasks associated with the conduct of Foresight, as well as information on the most common

time horizons, exercise duration, costs, territorial and sectoral scope, the number of participants engaged and their origin, and the outputs and outcomes of these exercises.

The pilot status of this project means that we have to make recommendations for further action in light of our findings. We believe that the project has been worthwhile and should now be extended to cover all identifiable Foresight activities, individuals and organisations in the enlarged EU28. But before embarking upon full-scale mapping, we suggest a number of intermediate steps are taken to 'stabilise' the mapping 'regime' (Chapter 5). Amongst these proposals is migration of the database to a better performing platform (we used MS Access during the pilot, but this will be unsuitable for an up-scaled database); usability trials, so as to fully test the relevance of our indicators; further development of the web interface; and articulation of a marketing strategy to promote interaction with the database.

Finally, the report includes an Annexe of all mapped activities in the database.

1. Introduction

Since the mid-1990s, Foresight has become increasingly prominent as a tool for informing policymaking. It is being used in a widening range of areas (from an initial focus on science and technology policies) and by a widening range of organisations. New Foresight initiatives are emerging to support policy formulation, network formation, and education and knowledge dissemination at many levels of territorial governance (EU, national, regional, cities, etc.). Similar phenomena can also be seen that address domain issues but which tend not to be viewed primarily in terms of their territorial context. For example, Foresight exercises are being initiated that focus upon business needs and concerns, future directions of scientific disciplines, and wider social agendas, such as crime, ageing populations, and work and culture.

Despite the rapid diffusion of the Foresight approach, there has been little effort to draw together accumulated experience. Yet, an *accessible collection* of Foresight experiences would no doubt constitute a useful resource for Foresight practitioners, policy makers, and analysts alike. It could also be extremely useful to those individuals and organisations new to Foresight but who are thinking about organising (or at least getting involved) in an exercise. With this in mind, the European Commission has recently asked the ESTO network to undertake a pilot project to begin to map Foresight **activities** across the EU15 and a selection of Pre-Accession Countries (PACs). Moreover, within the context of the emerging European Research Area (ERA), the project was also tasked with mapping the **competencies** of those individuals and organisations actively engaged in organising and managing Foresight activities. It is believed that information on such individuals and organisations will not only be a useful resource for identifying appropriate experience, but also a catalyst for further development and structuring of an emerging Foresight community.

In a nutshell, the project approach has involved collecting data by web search, interviews, and questionnaires on ongoing and completed Foresight exercises. Data was similarly collected on organisational and individual competencies. In all cases, frameworks of indicators constructed by the project partners were used to guide data gathering. The collected data was directly entered into a searchable web-based format for ease of accessibility and can be viewed online at the following temporary URL: http://les.man.ac.uk/eurofore

This report describes the rationale for the project in more detail (Section 1) before going on to summarise the various steps followed (Section 2). In these accounts, emphasis has been placed on the choices taken (in recognition that things could have been done differently). Section 3 summarises lessons learnt from the pilot, whilst Section 4 presents the web interface search options and includes some rudimentary analysis of the database. Section 5 draws together options and recommendations for further development in light of this pilot. Finally, a number of Annexes provide background material, including a listing of those activities included in the database.

This report is authored by the Operating Agent (PREST) and IPTS, but it could not have been written without the support and work of the other project partners. This report is

therefore the culmination of a collective endeavour between Kerstin Cuhls (FhG-ISI), Anette Braun (VDI), Walther van Aerschot and Sara Verbeiren (VITO), Annele Eerola, Juha Oksanen and Marja Nissinen (VTT), Remi Barre and Benjamin Delannoy (Futuribles), Attila Havas (MTA KTK), Karel Klusacek (TCP), Marc van Lieshout (TNO), Claudio Roveda (Fondazione Rosselli), Matthias Weber (ARCS), Erol Taymaz and Turgut Tumer (TUBITAK), Fabiana Scapolo and Mario Zappacosta (IPTS), and Michael Keenan and Dan Abbott (PREST).

1.1 Why Foresight?

Foresight is a proven approach for 'wiring-up' (national and regional) innovation systems – that is, to get the research, education, business, and policy communities working in closer harmony.[1] In this respect, the need for Foresight is particularly acute in Candidate Countries (CCs) and the cohesion economies of the Mediterranean, where national and regional systems of innovation are often 'fragmented'. Foresight can also be used to systematically assess the strengths and weaknesses of a given territory or domain with a view to setting strategic priorities and achievable goals. For example, it has been used by scientists, technologists, policy makers and industry to systematically identify new research directions. Foresight can also be very useful for garnering a better understanding of the importance of science and technology across policy fields and by society in general. But more than this, Foresight offers a new mode of inclusive governance, where policy formulation becomes more attuned to the realities of policy delivery. This is an invaluable asset in today's environment, where policy and investment decisions tend to be distributed across numerous actors.

A number of definitions of Foresight have been proposed over the last decade, with this project adopting that offered by FOREN.[2] The FOREN definition states that Foresight involves five essential elements:

- Structured **anticipation** and **projections** of long-term social, economic and technological developments and needs.
- **Interactive** and **participative methods** of exploratory debate, analysis and study, involving a wide variety of stakeholders, are also characteristic of Foresight.
- These interactive approaches involve forging new social **networks**. Emphasis on the networking role varies across Foresight programmes. It is often taken to be equally, if not more, important than the more formal products such as reports and lists of action points.
- The formal products of Foresight go beyond the presentation of scenarios and beyond the preparation of plans. What is crucial is the elaboration of a guiding **strategic vision**, to which there can be a shared sense of commitment (achieved, in part, through the networking processes).
- This shared vision is not a utopia. There has to be explicit recognition and explication of the implications for **present day decisions** and **actions**.

[1] Martin B & Johnston R (1999) "Technology Foresight for Wiring Up the National Innovation System", *Technology Forecasting and Social Change*, vol. 60, pp37-54

[2] Gavigan J, Scapolo F, Keenan M, Miles I, Farhi F, Lecoq D, Capriati M, and Di Bartolomeo, T (2001) *A Practical Guide to Regional Foresight*, European Commission, DG JRC-IPTS, Seville, EUR20128en

These defining features are particularly salient in today's policy and innovation environments, which is why Foresight approaches have proved to be so popular in recent times. The emphasis on each of the above listed features in a given foresight exercise may, however, considerably vary depending on the context and the issues considered.

1.2 Who is interested in Foresight and what sorts of information do they require?

Many Foresight practitioners would argue that everyone should be interested in Foresight since everyone has a stake in the future. In particular, policy makers, academics and policy analysts, other Foresight practitioners, and those new to Foresight who are thinking about organising some sort of activity are increasingly interested in the practice of Foresight as defined above. But what sorts of information are these people likely to want? As experienced Foresight practitioners and analysts, the project team anticipated the following 'first order' information demands:

- Information on those organisations and individuals with experience in the practice of Foresight. This data should be searchable, thus allowing the information user to specify key competencies, e.g. experience in the use of Delphi techniques, as a search term.
- Information on completed and ongoing Foresight exercises. Again, this data should be searchable, allowing the information user to identify exercises that are relevant to their interests.

In other words, we thought that many people would like to have a single reference point that comprehensively lists Foresight activities and competencies within Europe. But the project team also anticipated that some actors might have more sophisticated 'second order' information demands, including:

- Information on the most commonly used approaches in a given situation.
- Insight on 'good practice' in Foresight.
- Insight on the evolution and development of an emerging and evolving Foresight community of practitioners.

In theory, a database of Foresight activities and competencies can meet these first and second order information demands. Such a database, however, requires considerable skill and effort in mapping activities and competencies, and, just as importantly, in ensuring that information is kept up-to-date. This suggested the need for some initial mapping of activities and competencies in a pilot study. Depending on the results of the pilot, full-scale monitoring of Foresight activities and competencies could be undertaken.

The need for mapping Foresight activities and competencies is not a particularly new idea. For example, Futuribles was commissioned in the mid-1990s to produce databases on individuals and organisations involved in futures work, as well as on

futures studies.[3] Moreover, the ESTO network has already produced a study within the framework of the C+ Project on 'Monitoring Foresight Activities' (2001), which was mostly restricted to a first attempt at mapping Foresight activities at national level within the EU15.[4] Building upon this experience, the current pilot study has aimed to set the frames for a continuous monitoring of territorial and domain Foresight activities and experiences on a more stable basis. Thus, the pilot project's aim was to provide a contemporary snapshot of activities and experiences in territorial (national, sub-national, and EU) and domain (sectoral, disciplinary, etc.) Foresight across the EU15 and a selection of Candidate Countries (CCs) through a mapping exercise, with a view to:

- Mapping a broad cross-section of Foresight activities across Europe
- Capturing information on those individuals and organisations engaged in these activities
- Where possible, comparing and contrasting (on the basis of the mapping data) the conduct, impacts, and limitations of territorial and domain Foresight, with a view to drawing out some useful lessons for Foresight practitioners and analysts
- Eliciting methodological lessons for the benefit of future monitoring arrangements

The remainder of this report is a reflexive account of the various steps taken to meet these objectives.

[3] Jouvenel H (1996) *OSCAR: Futures Studies in Western Europe: Directory of Individuals and Organisations*, Paris: Futuribles International; Jouvenel, H (1996) *OCTAVE: Analytical Bibliography of Future Oriented Studies in Western Europe*, Paris: Futuribles International

[4] OST & CEST (2001) *Monitoring Foresight Activities*, ESTO Report, JRC-IPTS

2. Project Approach

A project of this nature requires not only the ability to collect data for entry into a database but also (a) an understanding of the nature of Foresight itself; (b) knowledge of where to look for data; and (c) some standing in the emerging Foresight community, since people are more willing to spend time providing information to those they know and trust. The project was therefore carried out by an international team familiar with Foresight, having either organised or analysed such activities previously themselves. A dedicated database and web designer was also employed by the project – he worked closely with the project co-ordinator (i.e. Operating Agent) throughout on the design and conduct of the data-entry exercise and the web interface.

A number of discrete steps were taken, starting with boundary-setting for the conduct of the project. This was followed by the development of a set of possible indicators for collecting data on Foresight activities, organisations and individuals – an initial indicator framework was 'tested' in a 'proto-study' before being refined for the full-scale pilot work. Once the indicator framework had sufficiently 'stabilised', the database was constructed and placed online for project partners to use. Full-scale data collection could then get underway, which involved (mostly) telephone interviews and e-surveys. Around eighty exercises and more than one hundred individuals and organisations were mapped in this way. The database was then given a more user-friendly web interface and a number of search routines developed. Finally, the project team debated the strengths and weaknesses of the mapping design (including the design of the database and the routines of data collection) with a view to presenting options and making recommendations for continuation of Foresight monitoring in Europe.

Work was divided between Consortium partners according to country (see Box 1). It was impossible to map everything in most countries, but then this was not the principal aim. Rather, we wanted to obtain a picture of existing activities and to elicit methodological lessons for the benefit of future monitoring arrangements. Accordingly, the number of exercises and individuals/organisations mapped in this project was limited, as shown in the Annexes. To reiterate, the aim was not to achieve comprehensive coverage but rather to map a cross-section of activities that will inform the development of long-term arrangements for Foresight monitoring. With this in mind, the following steps have been carried out:

1. Identification of the core factors (indicators) for (a) characterising and comparing Foresight-type activities at territorial and domain levels; and (b) capturing information on those individuals and organisations that are pivotally engaged in Foresight. These indicators were identified, in part, on the basis of what we already knew from existing work (especially from C+ and FOREN).
2. Development of a mapping procedure that allowed us to (a) identify relevant Foresight-type activities and individuals/organisations, and (b) allow collection of the requisite data.
3. Development of a database for storing and relating the data collected. The database has a web interface, both for entering and searching data.

4. Analysis of the data collected with a view to identifying similarities/differences, and key trends and issues. Since this is a pilot project, analysis has been confined to some basic frequency counts for the time being, but more ambitious analysis, e.g. cross-tabulation, is possible. In theory, this data analysis facility could be extended to users of the web site, but this will have to wait until the database is migrated and up-scaled (see Section 5).
5. Reflection upon the methodology with a view to proposing options for continuous monitoring arrangements vis-à-vis Foresight activities and the relevant individuals and organisations.

Box 1: Countries covered by Project partners

Consortium Partner	Country Coverage
PREST	UK, Ireland, Hungary, Czech Republic
IPTS	Spain, Portugal
FhG-ISI	Germany
VDI	Germany
Futuribles	France
VTT	Finland, Sweden, Denmark, Estonia
Fondazione Rosselli	Italy, Greece
ARCS	Austria
VITO	Belgium, Luxembourg, Slovenia
TNO	Netherlands
Tubitak	Turkey

2.1 Framing the project boundaries

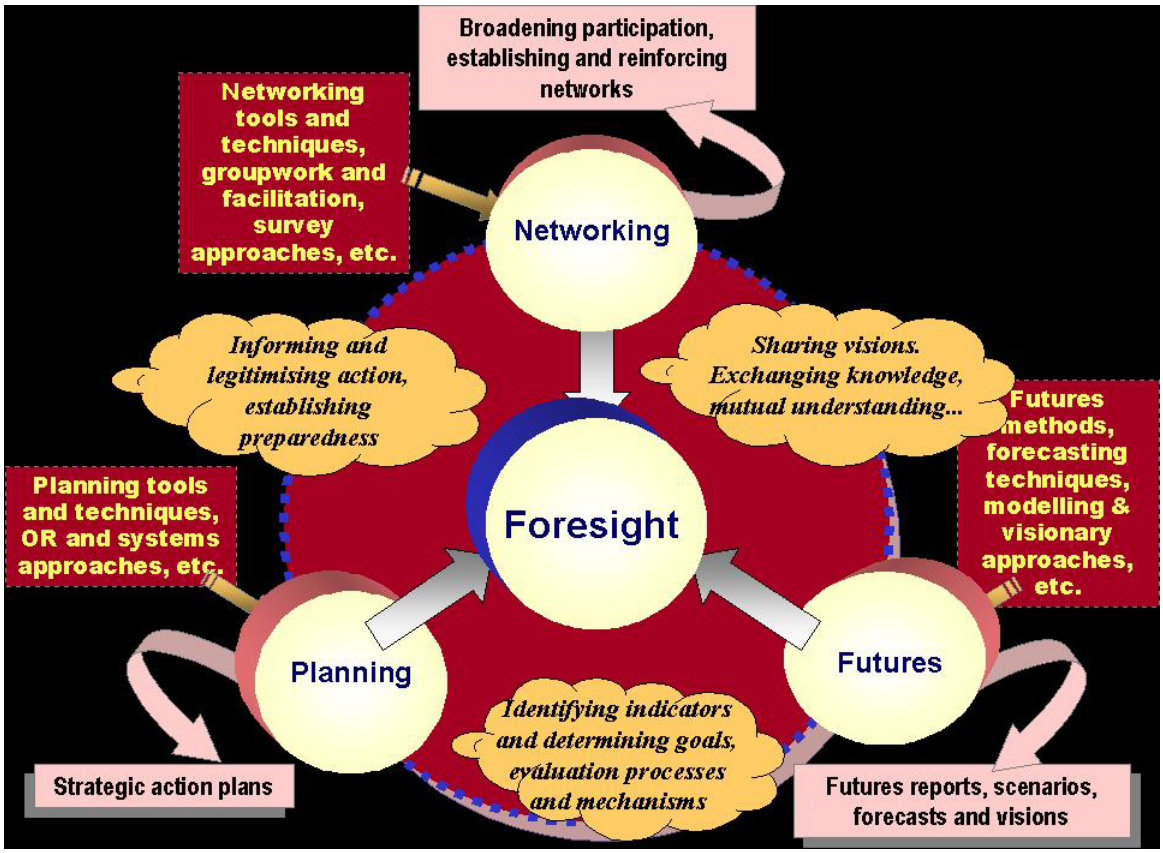
Some significant boundary issues have had to be addressed in this project to ensure that it remained manageable within time and budgetary constraints. Examples of boundary issues included what we took to mean as 'foresight', the territorial and domain coverage of the activities to be mapped, and what we understood by the term 'competencies'. Since the aim of this pilot study was not to try to map all Foresight activities and competencies in Europe, some boundary issues were of less immediate concern than others. Thus, not all of these boundary issues had to be resolved in this pilot project, although the task of this report is to discuss options broadly and to provide recommendations where appropriate.

2.1.1 Foresight in the wider spectrum of Strategic Policy Intelligence (SPI)

'Foresight' is a much-used (and abused) term. Some activities, individuals and organisations have claimed a spurious association with Foresight. At the same time, there are those that are involved in Foresight but that fail to use the label. On top of this labelling problem lies confusion of where the boundaries with forecasting, traditional futures studies, and (strategic) planning lay. Over the last year, some work has been done to address some of these boundary issues.[5]

[5] Miles I (2002) "Appraisal of Alternative Methods and Procedures for Producing Regional Foresight", paper prepared for STRATA-ETAN Group on Regional Foresight, DG RTD

Figure 1: Foresight's 'triple base' (Miles, 2002)



For our purposes, we had to arrive at practical criteria as a basis for inclusion of activities, individuals and organisations in the database. The criteria used are shown in Box 2 and are based on those developed by FOREN. In practice, there was little opportunity for most project partners to employ the criteria stringently – in particular, it was often difficult to track down relevant Foresight activities to map so that the criteria were sometimes interpreted rather broadly.

Box 2: Definition of Foresight used in the project

According to the project definition, a Foresight exercise should have:

- A long-term orientation, even though the objective is to inform current decisions. Long-term generally refers to a period of ten years, though it can generate insights as to much more immediate developments.
- It employs formal techniques, which are based on eliciting expertise, structuring the approach, synthesising different sources of information and the outcomes generated by the process.
- It is wide in the factors examined. This means that it requires an interdisciplinary approach, with the pooling and sharing of very different expertise.
- It is interactive, drawing on knowledge and views that are distributed across many sectors and organisations, and helping to build links amongst these.
- It is institutionalised, creating networks and channels of communication between these different actors.

2.1.2 Historical reach

The question was raised on how far back we should look when searching for Foresight examples. Studies have been conducted since at least the 1970s that could have been potentially covered in this project. However, given fading memories and the practical difficulties in obtaining written material on exercises conducted more than a decade ago, it was decided that 1990 should be the earliest date for inclusion in the database. At the same time, it was also decided that the project could include ongoing activities, just so long as they were already underway (we did not want to include plans still on the drawing-board).

2.1.3 Technology focus

Foresight has been applied beyond the area of technology, especially in regions and more socially-oriented domains. We therefore had to consider whether to focus only on "technology" Foresight, or whether a broader approach needed to be adopted. It was borne in mind that many so-called "technology" Foresight exercises seem to "inevitably" stray into other more social issues, making clear demarcation sometimes difficult. On the other hand, explicitly covering other foci from the outset could mean too many activities to cover (and perhaps of limited relevance for the main project client, DG RTD). We therefore decided to cover only those exercises that have an explicit interest in technology.

2.1.4 Territorial coverage

It was initially planned to cover the EU15 and 13 Candidate Countries (CCs), but due to resource constraints, we had to limit the number of CCs in this pilot study, to include only five countries – Hungary, Czech Republic, Slovenia, Estonia and Turkey. This means that coverage should be extended once the monitoring arrangements have "stabilised".

But our concern with territorial coverage required more than consideration of just country 'breadth' – we also had to think about 'depth' when we came to map activities (this tended not to be a direct issue with mapping individuals and organisations). For instance, we considered whether to examine city and municipality Foresight, or whether to constrain ourselves to larger sub-national units, such as regions. Further 'breadth' issues also emerge at these levels, since it was impossible to consider all cities, municipalities and regions in the countries covered.

In theory, this should have required some selection (and the concomitant development of selection criteria), but in practice, many project partners simply relied upon their existing knowledge of activities, individuals and organisations. Much of these existed at the national level rather than lower territorial levels – this may mirror the biases of the project partners, but it could also reflect the fact that many city and municipality Foresight exercises are not explicitly concerned with technology, thus falling outside the remit of this project. It might also be explained by a relative absence of Foresight activities at these lower territorial levels, where Foresight is still embryonic in its development. Mapping activities and competencies at the sub-national and domain levels offers particular challenges, not least because these tend to be far less visible to

the analyst than the large-scale national programmes, and data tends to be sparse and certainly more widely dispersed. Drawing this information together could therefore be a major added value of a future full-scale mapping project.

2.1.5 Domain coverage

A fully-fledged mapping exercise would have to seek to cover all domains (or at least those where the European Commission has some interest). But for the purposes of a pilot, it was thought necessary to focus on just a few sectors initially, thus requiring selection. However, it was quickly realised that a rigorous pursuit of a selection strategy would require the adoption (or possibly development) of a sectoral classification structure and probably some clustering in order to provide operational search heuristics. There was little time to do any of this. Thus, a first step was to review the extent of domain activities, since it was possible that such Foresight activities are not so widespread and the challenge may in fact lay in identifying relevant activities (this was in fact the case in most countries). Again, project partners tended to rely upon their own knowledge of such activities and few (if any) conducted a systematic review of domain activities in their countries.

2.1.6 Size of exercises

There was some discussion of setting a 'threshold' limit on the size of Foresight activities we wanted to include in the database (the same issue did not apply to individuals and organisations). However, it was quickly realised that the notion of "size" is open to multiple interpretations, e.g. does it refer to the number of persons involved, the number of themes covered, the costs and/or duration, etc.? The definition of Foresight used in the project to some extent necessitates activities of a certain scale, particularly if we are serious about the participation elements. Thus, a pragmatic approach was followed that saw this boundary issue largely ignored – our definition of Foresight would 'naturally select' activities of sufficient scale for inclusion.

2.1.7 Activity sponsors

It was decided at the outset that the project should only focus on Foresight activities in the public domain. This meant that most activities mapped were, for the most part, publicly funded by states or regions. The main exceptions to this public sector orientation were those activities funded by industrial federations and the like, which are often in the public domain. By contrast, since corporate Foresight activities are proprietary, they often remain secret – this creates difficulties for accessing information on such exercises.

2.1.8 Defining competencies

The European Commission was keen for this study to explore the experiences of those involved in Foresight across Europe, since it would like to have information on Foresight 'competencies' within the emerging European Research Area (ERA). Notwithstanding the definitional problems associated with the term 'competencies', it was decided that the mapping exercise should seek to capture relevant details on those individuals and organisations 'pivotally engaged' in Foresight activities in Europe. By this, we mean those who are involved in the day-to-day organisation / management of exercises, as well as Foresight 'specialists' (academics, theoreticians, futurists). But

some basic information was also collected on those organisations that sponsor and promote Foresight activities. Whilst these might not possess in-house competencies to conduct Foresight themselves, their supporting roles suggest that they have some understanding and 'absorptive capacity' for such activities. This may prove to be important information in the construction of a wider Foresight community of practitioners *and* users.

2.1.9 Potential users

From the outset, we asked ourselves the question, "Who are likely to be the users of a web-based searchable database detailing Foresight experiences and competencies?" Who will have 'first order' and 'second order' information demands of the database? The answers to this question would have implications for the indicators used, the data collected, and the presentation and delivery of the database. We anticipated that users might include Commission officials, officials from other public bodies (mostly at national and sub-national level), academics and other analysts, and Foresight "entrepreneurs", i.e. those people who are involved in establishing and/or shaping Foresight activities. We have therefore tried to gather information that we think will assist these potential users. But we always recognised that different users would want different levels of detail, so the presentation of the data collected will be of crucial consideration.

2.2 Identifying Indicators for the Activities Database

Building on the extensive knowledge of the project team and taking into account the perceived needs of potential users, indicators were developed for mapping Foresight activities. Indicators already developed for mapping Foresight activities in the C+ Project (national Foresight) and within the context of FOREN (regional Foresight) were used as starting points. Criteria for selecting indicators included:

- Clarity and the extent to which they are informative, thus allowing practitioners and policy makers to draw useful lessons for future practice
- No preference for qualitative or quantitative indicators. We knew that most indicators would be qualitative, but that some of these could be characterised sufficiently to allow for options (values) to be assigned (rather than open text fields)
- Degree of discrimination, i.e. the extent to which indicators allow us to discriminate between exercises with different characteristics
- Ease of data collection – there was little point in using 'wish-list' indicators around which it would be near-impossible to collect data
- Ability to capture the essence of Foresight activities at the national, regional and sectoral levels. This meant that indicators had to be as much process-oriented as product focused

A further issue in this respect was whether both territorial and domain Foresight activities could be effectively mapped using the same set of indicators. Our preference was for a common format, not least due to the difficulty of clearly demarcating between territorial and domain Foresight activities in some instances. We also had to take

account of the different scales of Foresight activities to be mapped – some would be large national exercises with complex organisational structures whilst others would be much more modest. Clearly, our indicators had to be capable of capturing the essential features of large complex exercises, but we were aware that some of these indicators might prove to be redundant for smaller activities.

In order to nurture a common understanding (between project partners) of the meaning of the indicators, a **proto-study** was carried out involving the 'testing' of the proposed indicator set on one domain and one territorial Foresight activity by each partner. The framework proved to be reasonably robust, with only a few changes suggested for the main mapping exercise. The set of indicators eventually used in the main mapping exercise are shown in Table 1. As can be seen, the indicators were divided across five tables in the database, each of which is outlined below.

Table 1: Indicators used for mapping Foresight activities

Table 1: Background
Name of Exercise (in own language) and (in English)
Exercise Web Address
Start Date
Status
Duration
Estimated Cost (€)
Territorial Scope
Territory
Sectoral/Thematic Scope
Sector/Theme
Formal Objectives
Rationales

Foresight Barometer
Time Horizon
Approx. No. of Participants
Diversity of Participants
Place of Formal Techniques
Direct Action-orientation

Main Source of Finance

Main Promoter

Table 2: Scope
Orientation and Coverage
Primary Target Audience
Secondary Target Audience
Breakdown in Number of Participants
Origin of Participants

Table 3: Organisation and Management
General Managing Organisation
Main Project Partners
Main Organisational Features
Knowledge Management
Links with other Foresight-related Activities

Table 4a: Tasks and Methods (Pre-Foresight)
Raising Awareness of the Exercise
Scoping the Exercise
Locating Experts
Locating Stakeholders

Table 4b: Tasks and Methods (Main Foresight)
Raising Awareness of the Exercise
Gathering Background Information
Identifying Drivers and Perspectives
Eliciting Wide Participation
Presenting Future Developments
Managing Diversity of Opinions and Integrating Views
Defining Key Actions and Priorities

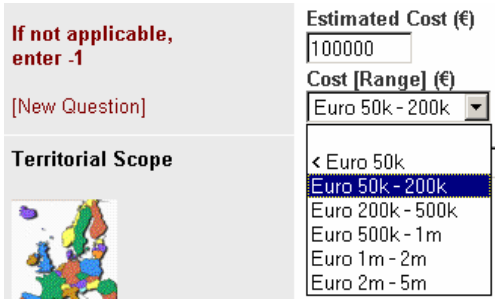
Table 4c: Tasks and Methods (Post-Foresight)
Dissemination Activities
Evaluation

Table 5: Outputs and Outcomes
Nature of Formal Outputs
List Publications & Web Resources
Expected Impacts
Unexpected Impacts

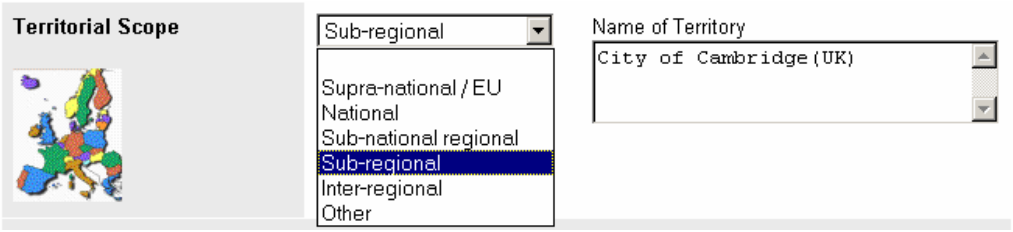
2.2.1 Table 1a: Background

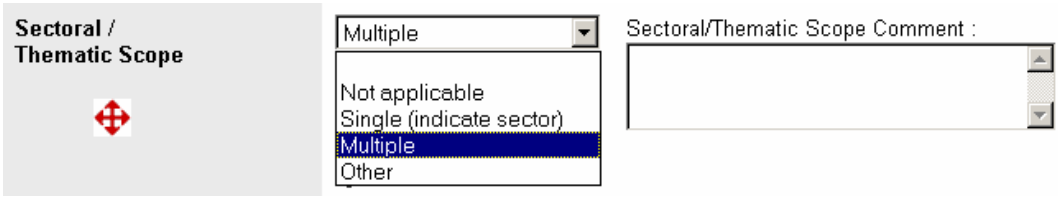
Basic information on each exercise was first collected – its **name** (in own language and English), **web** address, **start** date and **duration**, and its current **status** (ongoing, completed).

The **cost** of each activity was also sought (in Euro), meaning its 'official' budget rather than the 'real' costs associated with Foresight. In other words, the costs associated with things like participants' time (which is often given freely) were not taken into account, due to difficulty in their estimation. Costs were at first recorded as an absolute figure, but were later collected as a range, as shown opposite.

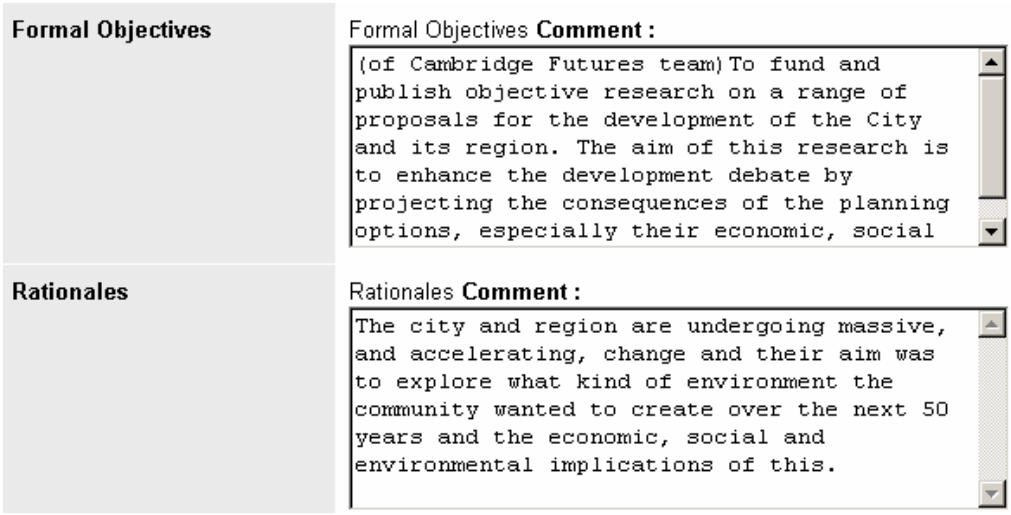


Next, the **territorial** and **domain** (sectoral/thematic) scope were sought – was the exercise national, regional, supranational, etc.? And did it focus on a single sector/theme or upon several? A range of options were given, with accompanying text boxes for given territories and domain areas to be recorded.





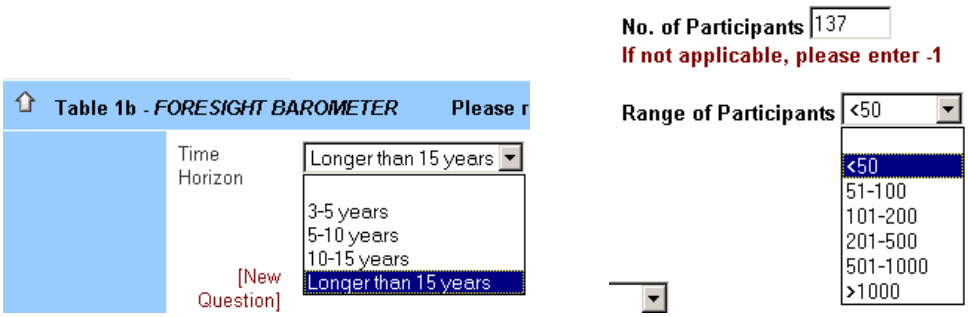
Finally, the formal **objectives** and **rationales** given for each activity were recorded in free-text boxes – these would have to be based on official statements surrounding the exercise.



2.2.2 Table 1b: Foresight Barometer

It was recognised from the outset that some exercises would meet our definitional criteria of Foresight more than others. With this in mind, we tried to indicate the 'foresightness' of the exercises we were mapping through the use of what we called the **'Foresight Barometer'**. The concept of the Barometer drew on the definition of Foresight being used in the project and was, accordingly, given five elements:

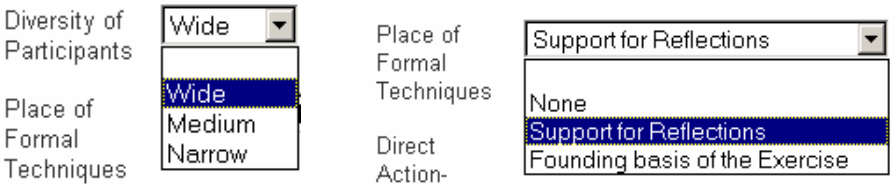
1. **Time Horizon** – activities calling themselves 'Foresight' sometimes have very short time horizons, as short as 3-5 years in some cases. In such cases, doubt might be cast on whether such activities are 'real' Foresight exercises. Counter-arguments usually claim that such short time horizons constitute long time horizons for the sector or audience (normally a business one) being addressed. With its extensive experience of Foresight, the project team exercised 'common sense' in deciding whether any given activity should be included in the database. For those activities that were included, a range of time horizons (from "3-5 years" to "longer than 15 years") was offered.



2. **Number of Participants** – Foresight exercises are often distinguished from traditional futures studies by the large number of people they actively involve. But from the outset, we recognised two problems in operationalising this indicator: (1) the concept of 'involvement' is

problematic – for example, this number could refer only to those 'intimately involved' in an exercise (such as members of a panel or working group) or it could be extended to those more loosely involved in an exercise (e.g. an attendee at a workshop or a respondent to a Delphi survey). The project team decided that the total number of participants, to include those intimately and more loosely involved, should be recorded as a measure of an exercise's extensiveness; (2) there is an issue whether the number of participants involved in an exercise is a good indicator of its 'foresightness'. For instance, we might ask whether a national exercise involving 200 people (a relatively low number given the national average) has more 'foresightness' than a regional furniture industry cluster exercise involving 100 participants. This is doubtful – the difference in numbers is obviously attributable more to the varying scales at which Foresight exercises can be conducted. Despite these problems, it was recognised that the number of participants involved in an exercise is an essential piece of information and so this data was collected using a range from <50 to >1000.

3. **Diversity of Participants** – Foresight is often noted for its strength in transgressing (disciplinary, business, policy) boundaries, something that is more readily achieved by involving a diverse variety of participants. In this sense, Foresight is said to offer a 'hybrid forum' for different groups (within and across organisations) to come together and debate visions of the future.[6] Nevertheless, a good number of activities that call themselves Foresight tend to involve only those people who already speak to one another regularly and who hold similar views and beliefs. For the purposes of the mapping project, these have been labelled as 'narrow' exercises, whilst those that involve participants from a wide variety of backgrounds have been labelled as 'wide'. Recognising that some sort of halfway position may exist, we decided to also include the option of 'medium' diversity. Of course, these classifications are somewhat subjective and are again dependent upon (at least in part) the scale of the exercise being mapped (where a large national exercise has, in theory, a greater potential to engage a diverse range of groups than a small sectoral exercise).

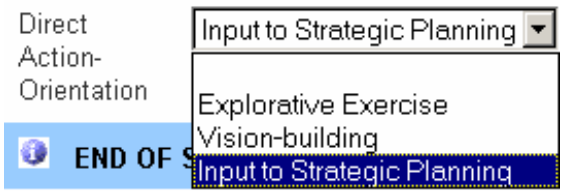


4. **Place of Formal Techniques** – by formal techniques, we mean those methods that have been mostly borrowed from the forecasting and futures fields, such as Delphi, scenarios, cross-impact analysis, etc. (although what constitutes a non-formal technique is problematic). These formal techniques tend to be used for a number of reasons: for example, they help to discipline participants to consider plausible futures in a systematic way; they are also useful for aiding and structuring creative thinking (thinking 'outside of the

[6] Larédo P & Rip A (1996) Discussion paper presented to the ASTPP network, mimeo

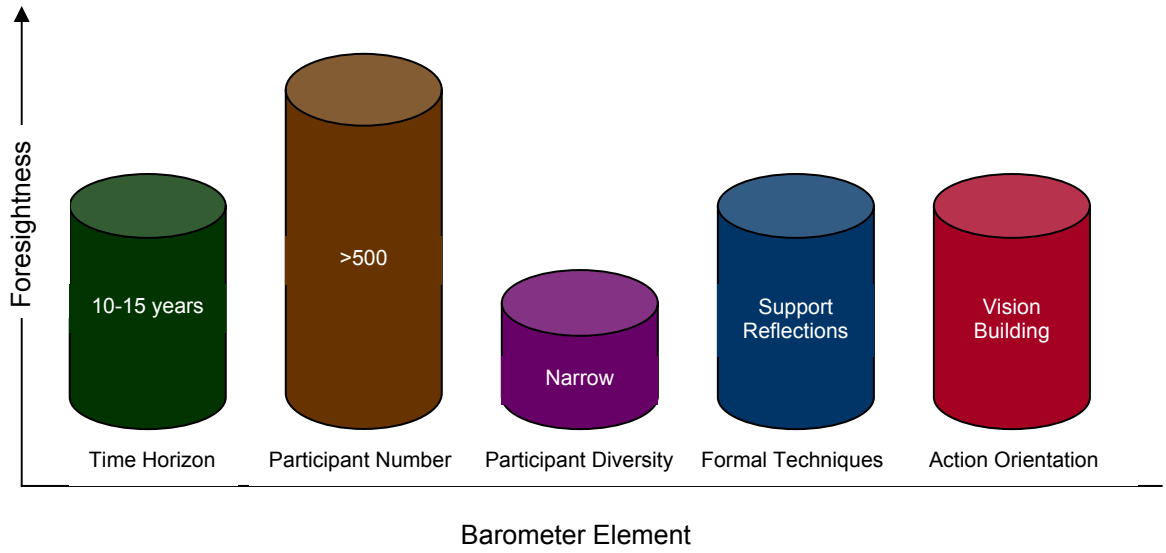
box'); they can be used to structure interaction between different groups of participants; and they can be useful for summarising results. On the other hand, the use of formal techniques is not a prerequisite for the conduct of a successful Foresight exercise. Moreover, there are examples of poor or tokenistic use of such formal techniques where non-use would have been preferable. But their absence from an exercise does tend to arouse suspicion that it may not amount to a 'real' Foresight exercise. For this reason, we decided to collect data on the use of formal techniques, even though it is an imperfect indicator of 'foresightness'. When they are used, we recognised that formal techniques can be of varying importance to the conduct of an exercise. We therefore distinguished between the use of formal techniques only as a "support for reflections" and their use as the "founding basis of an exercise" (such as some of the Delphi exercises carried out at the national level).

5. **Direct-action Orientation** – this refers to the extent that the exercise was connected to decision-making and action. Unlike much futures studies work, another key distinguishing feature of Foresight is its explicit linkage to action. In this respect, Foresight is close to (or perhaps even synonymous with) *la prospective*. However, the project team was aware that there are varying degrees of action-orientation built into Foresight exercises. Some exercises are simply "explorative", with few or no stated links to public and/or private decision-making (although they are expected to somehow make a difference). Others are geared towards "vision-building", with the aim of mobilising territorial and/or sectoral actors to arrive at a shared vision that could provide for actionable goals (often outside the spatial and/or temporal confines of the exercise itself). Still others explicitly set out to provide "inputs to strategic planning" within the public and/or private sectors. The main distinction between these last two options is that the former is more diffuse and distributed in its mode of action, whilst the latter is focused and more directed at the strategic planning practices of a single (or small number of) public or private organisation(s). The options are 'accumulative', in that it is assumed that "inputs to strategic planning" will require an exercise to be "explorative" and involve a modicum of "vision-building".



Since these elements were intended to constitute a 'Barometer', some consideration was given to how they could be visually represented so as to provide a snapshot of any given exercise's 'foresightness'. The underlying assumption is that more of something – whether this is (1) a longer time horizon, (2) a large number of participants, (3) a diverse selection of participants, (4) an extensive use of formal techniques, or (5) a closer connection to decision-making and action – is a measure of an exercise's 'foresightness'. One possible representation of these relationships is shown in Figure 2.

Figure 2: A possible representation of the Foresight Barometer



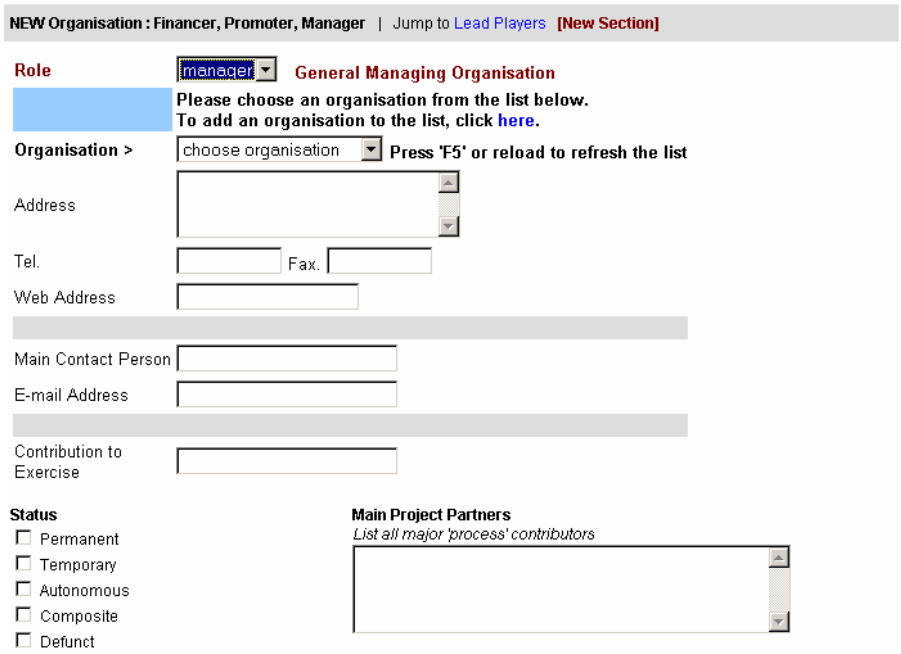
However, the foregoing description of the five elements of the so-called 'Foresight Barometer' illustrates that the concept is not without its problems. In particular, each element is open to multiple interpretations whilst some of the variables used to describe them are rather subjective. Moreover, the underlying assumption that more of an element indicates that an exercise has more 'foresightness' can be questioned. Certainly if an exercise has (1) a short time horizon, (2) a small number of participants, (3) a narrow selection of participants, (4) little or no use of formal techniques, and (5) little or no connection to decision-making and action, it really should not be described as a Foresight exercise. But can we say more than this using the Barometer?

In defence of the Barometer, the key thing to bear in mind is that it should be read as a whole rather than through its individual parts. The point is that, taken together, these elements are more than the sum of their parts in giving us a picture of the 'foresightness' of a given exercise. It is for this reason that the project team retained the idea of the 'Foresight Barometer'.

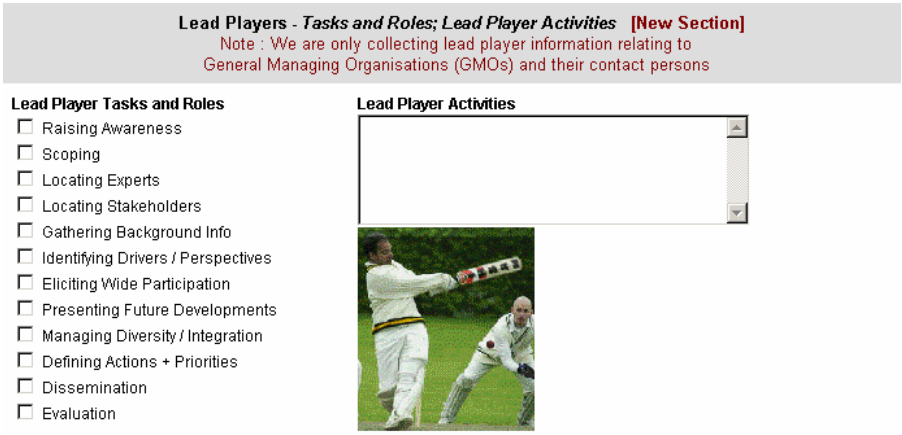
2.2.3 Table 1c: Organisations involved

Organisations may be associated with Foresight exercises in any number of roles. For ease, we identified three groups: General Managing Organisations (GMO) and their project partners; financial sponsors; and Foresight promoters. The most important of these for our immediate purpose was the GMO, since this was where Foresight competencies were most likely to reside. The GMO is the organisation responsible for the day-to-day management of Foresight and is often aided in its task by what we have called 'project partners'. The latter may be academics, consultants, futurists, etc. who lend process support. For the GMO, we sought basic information, such as name,

address, contact person details, and their contribution to the exercise being mapped. We also wanted to know whether the organisation was permanent / temporary, autonomous / composite, still in existence / defunct. This information was originally sought in Table 3, but it was later decided to streamline parts of the activities database and to move the GMO data to Table 1c.



We also sought specific information on a GMO's contributions to the key tasks set out later in Table 4 (see below for details). Originally, this data was collected in Table 4, but this proved too complicated and messy. For this reason, things were simplified somewhat and data transferred to Table 1c.

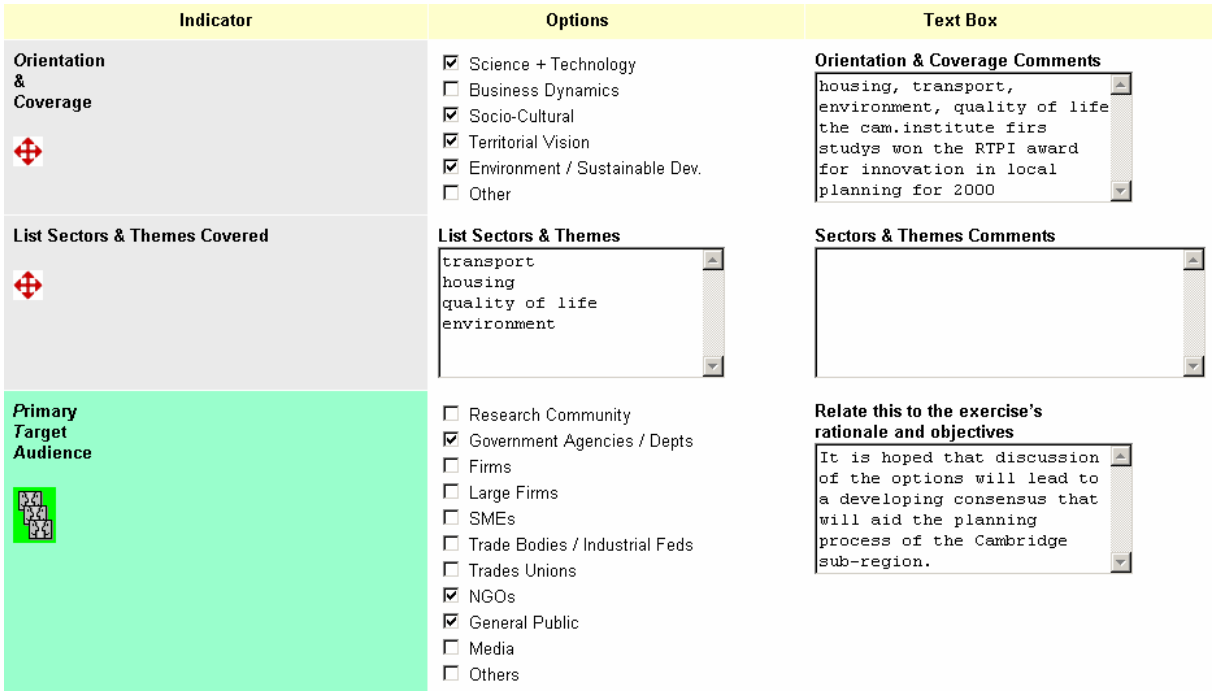


For Foresight sponsors and promoters, the data collected was simpler in nature. We collected the same contact information as for the GMO, but then sought only to determine the financial contribution of the sponsor and the support provided by the promoter.

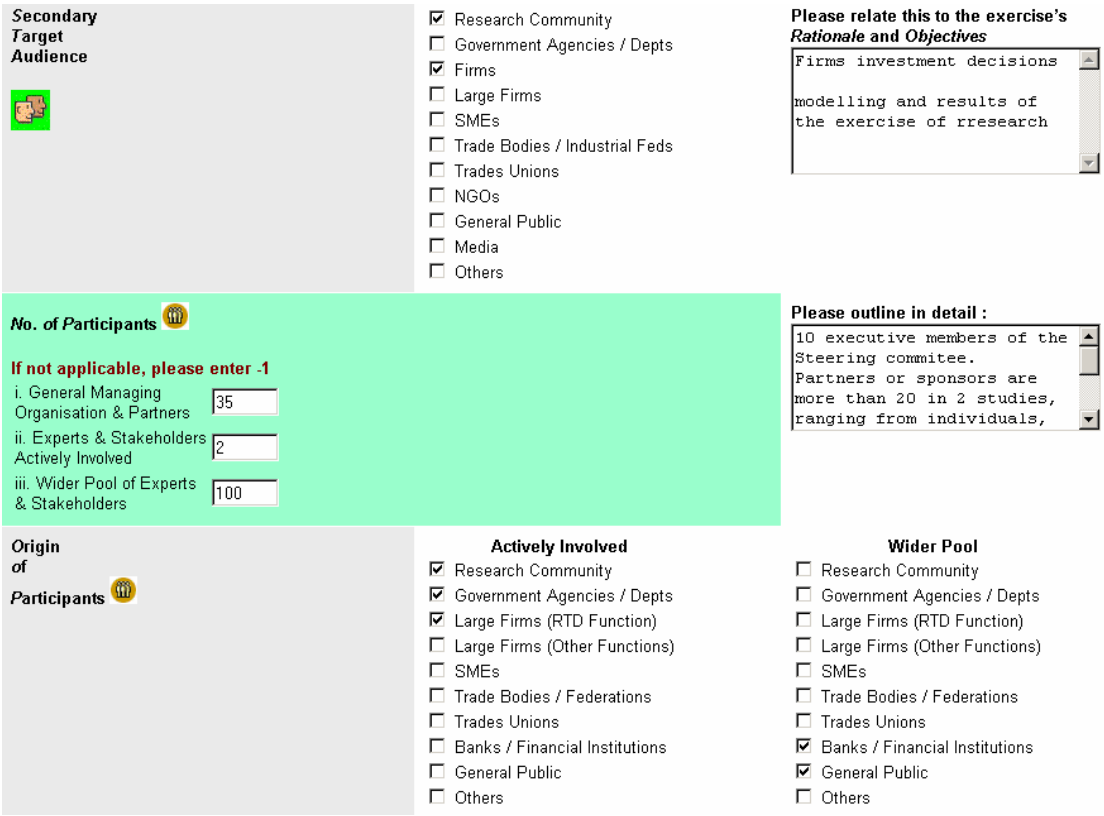
In some respects, Table 1c was a pivotal table in the database, since it was a link between the mapped exercises and the organisational and individual fiches. As we have seen, it also related to the key tasks set out in Table 4 of the activities database (see below).

2.2.4 Table 2: Scope

Foresight exercises are conducted at a wide variety of scales and are targeted at a wide range of actors. These considerations are likely to have a strong bearing on the design features of Foresight. The first thing we considered was the **orientation** of an exercise, which is closely related to the objectives and rationales recorded in Table 1. But rather than using an open-text field to indicate an exercise's orientation, we decided to attempt to use five possible orientations to characterise an exercise. Thus we asked whether an exercise was oriented towards "science and technology", where it explicitly focuses upon identifying areas of new research and technological development. Or was it oriented towards "business dynamics", with a focus on the opportunities and threats concerning business sector development. Or was the orientation towards "socio-cultural" issues, such as youth culture, the media, leisure pursuits, etc. Or was it towards the development of a broad "territorial vision", where a territory seeks to develop a collective vision of its development goals and trajectory. Or did it focus on the "environment and sustainable development", e.g. as part of an Agenda 21 implementation strategy. Note that exercises often had more than a single orientation, so multiple selections were allowed. In addition, the sectors and themes explicitly covered by an exercise, e.g. through sub-groups and expert panels, had to be provided. There was some scope for repetition here with Table 1, but the intention had always been that the information given in Table 2 would be more extensive. Finally, a comment box was available for any elaboration.



Next, we considered the **target audience**(s) of Foresight. These were divided into primary and secondary targets, the former referring to those groups that the exercise explicitly set out to influence, and the latter denoting those who the exercise sought to indirectly inform and influence. This distinction was deemed particularly necessary for large territorial exercises, where several target audiences of varying significance are often engaged. A number of options were offered, including the research community, firms, and citizens. Text boxes were also provided for any elaboration.



Whilst the Foresight Barometer would be used to collect data on the total **number of participants** involved in an exercise, Table 2 sought to obtain a breakdown of this number. Three general categories were used: first, those intimately involved in the management of the exercise, such as a project team and/or any consultants used; second, those experts and stakeholders actively involved in an exercise, e.g. serving as panel members; and third, those individuals engaged more widely, for example, workshop attendees, questionnaire respondents, etc.

Finally, information was gathered on the **origin of participants**. Anyone can be involved in Foresight exercises, including academics, business people, public officials and even citizens. A list of possible groups was provided with tick boxes. We also wanted to know which groups were being intimately engaged in Foresight exercises as well as those who constituted a wider pool of (less engaged) participants. We anticipated that in many cases, this distinction would not register – the same groups engaged more widely would also be involved intimately. However, it was thought that

exceptions could easily arise – for example, whilst citizens are sometimes given the opportunity to engage in Foresight exercises, they are only rarely intimately involved as agenda-setters, e.g. as members of panels. We therefore used two sets of tick boxes, one for those intimately engaged and another for the wider pool.

2.2.5 Table 3: Organisation and Management

Foresight exercises come in various shapes and sizes. Many involve the establishment of panels or working groups, whilst others may be confined to one or two individuals organising surveys, interviews and workshops. Moreover, exercises are typically split into distinct steps or stages, and this influences their organisation at different times. The project team found it difficult to arrive at an agreed set of characteristics that could satisfactorily capture the perceived diversity of exercises. For this reason, we used an open text field to describe the **main organisational features**. It was hoped that gathering this information in an open format during the pilot project could inform the development of some meaningful indicators later on (see Chapters 3 & 4).

Indicator	Options	Text Box
Main Organisational Features	Main Organisational Features :	The work in the first study was organised through a Steering Group and an Executive Committee with one full time member of staff. The work in the second study,
Knowlege Management	Any elaboration should be done in no more than four sentences	meetings of the Ex.committe and general correspondence. meetings have a regularity of once a month or two months.
Links with other Foresight related activities	Any elaboration should be done in no more than four sentences	other foresight exercises in transport planning in accross the world (Japan, Chile) due to the experience of Prof. Echenique and Dr. Tony Hargreabes (senior

Given the number and diversity of participants often engaged in Foresight, not to mention the extensive organisational structure of some of the larger exercises, a key issue when conducting a Foresight exercise is **knowledge management**. Foresight exercises involve generating and sourcing information resources – information about the past, present and future, as well as specific information about territories, domains, and organisations. Depending upon the scope of an exercise, this information will be more or less generated and sourced across space and time. We decided to pay particular attention to the way that knowledge is transferred horizontally between different parts of an exercise. This is especially a challenge in larger exercises with a lot of activity going on in parallel. We also focused upon the ways that knowledge is collated from across an exercise and synthesised. As with describing the main organisational features of an exercise, we decided that knowledge management arrangements should be described in an open text field. Again, it was hoped that gathering this information in an open format during the pilot project could inform the development of some meaningful indicators at a later stage.

Finally, we sought to obtain information on **links with other Foresight-type activities**. By links, we meant sharing of results primarily. For example, a regional Foresight exercise might make use of results and/or background material generated in a national exercise, as has happened in the UK. It would have been interesting to also collect information on cognitive links (i.e. how the design of a given exercise was influenced by other exercises), since this could provide some insight into the 'diffusion' of ideas on the conduct of Foresight. However, the project team decided that this would be too ambitious in most cases – cognitive links are difficult to trace and any that might be highlighted would be very much dependent upon who one talks to.

2.2.6 Table 4: Tasks and Methods

There are a number of tasks typically associated with 'doing' Foresight and a variety of methodological approaches for each. Work conducted jointly by PREST and FhG-ISI for the Polish Government,[7] which was later taken up and developed in FOREN, identified many of these tasks. In parallel to this, the C+ Project developed a similar framework of tasks, placing them into pre-, main and post-Foresight phases (Martin and Irvine[8] were the first to use this temporal division for analysis of Foresight exercises). In other words, the project team had some foundational basis on which to build.

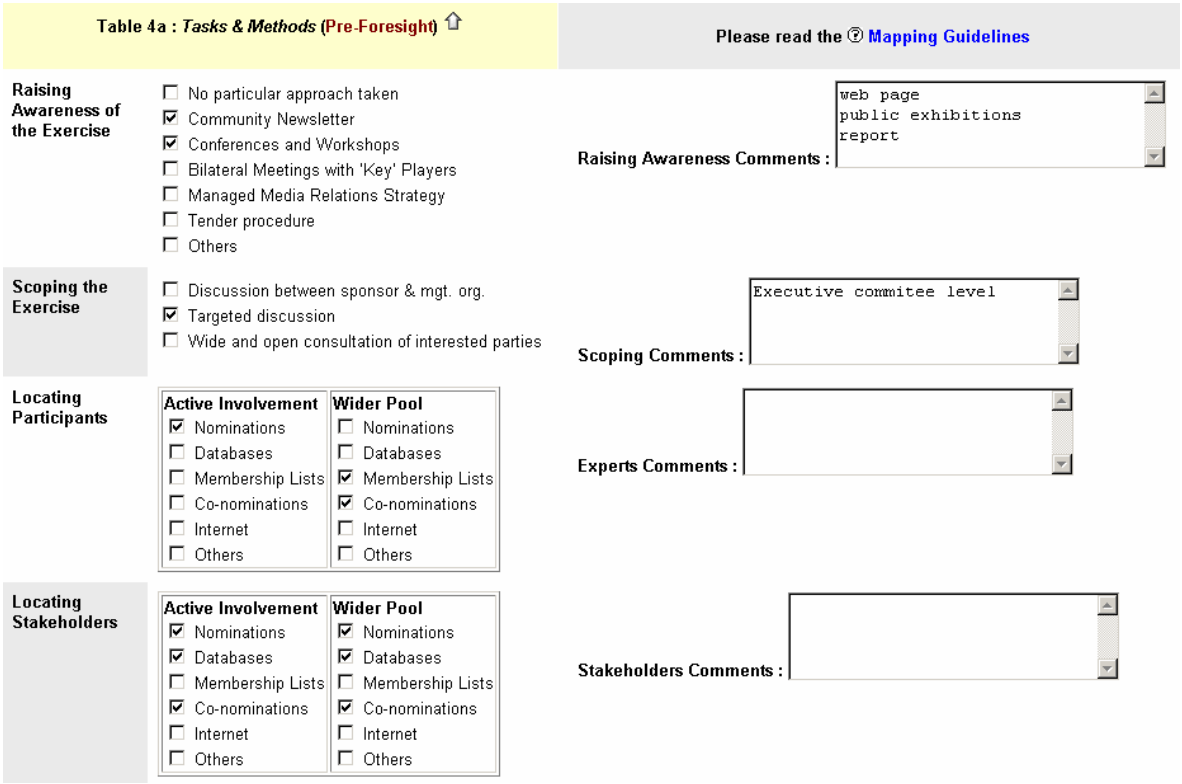
It was decided that the pre-, main and post-Foresight phase framework would be used to divide the tasks. Although we were well aware of the difficulties of dividing exercises into distinct phases (especially for smaller activities), it is clear that many Foresight tasks require others to be carried out first. Thus, data was collected in three 'sub-tables', as follows:

Table 4a: Pre-Foresight

The idea of conducting a Foresight exercise, irrespective of its scale, requires support if something is to happen. The concept and practice of Foresight must be explained and duly appreciated for it to become a reality. Much of the persuasion work associated with **raising awareness** of Foresight tends to be carried out by individual (or a small group of) advocates, who might be public officials, elected politicians, academics, industry lobbyists, etc. They have been convinced of Foresight's worth, but must use methods to convince others, e.g. organise awareness workshops, write newspaper articles, organise meetings with potential sponsors, etc. These and other methods are included in the database as tick box options, with a comment box provided for any elaboration.

[7] A summary of the findings of this work is provided in Keenan M (2001): "Planning and Elaborating a Technology Foresight Exercise", paper prepared for the UNIDO Regional Conference on Technology Foresight for Central and Eastern Europe and the Newly Independent States, Vienna, April 2001. Available at http://www.unido.org

[8] Martin B. & Irvine J. (1989) *Research Foresight*, (London: Pinter)



Once the decision is taken to organise a Foresight exercise (and the financial resources committed), it will need to be **scoped**. By 'scoping', we mean the processes by which the time horizon, duration, organisation, coverage, costs, etc. of the exercise are debated and decided upon. A number of different possible approaches were provided as tick boxes, and any elaborations included in a comment box.

Finally, we considered the methods used for **locating participants** (including experts and other stakeholders). These range from informal approaches, e.g. calling a friend, to more formalised methods, such as co-nomination. A distinction was made between those intimately engaged in the exercise, e.g. as panel members, and those more loosely involved, e.g. as scenario workshop attendees. It was thought possible, if not likely, that different methods would have been used to locate these different 'levels' of participants. A number of different possible approaches for locating participants were provided as tick boxes, and any elaborations included in a comment box.

Table 4b: Main Foresight

Maintaining the momentum in a Foresight exercise and continuously engaging/enrolling existing/new participants are essential tasks. Participants should be kept informed of what is going on in total, as should the target audience and exercise sponsor. New groups may need to be engaged at several points in an exercise. Of course, the scale of this task will depend upon the scale and scope of Foresight activity. Thus, we sought information on the methods used for **raising awareness** of the exercise during its conduct. A number of options were given as tick boxes, along with a comment box.

A common misconception of Foresight is that it depends solely on discussions of participants (for example, in panels and workshops) for its knowledge base. In fact, the

real picture is somewhat different, with all sorts of baseline and benchmarking analyses, statistics, think pieces, and forecasts and futures studies commonly used as **background material**. Such information must be gathered, with different approaches available for doing this. Again, tick box options and a comment box for elaboration were provided in the database.

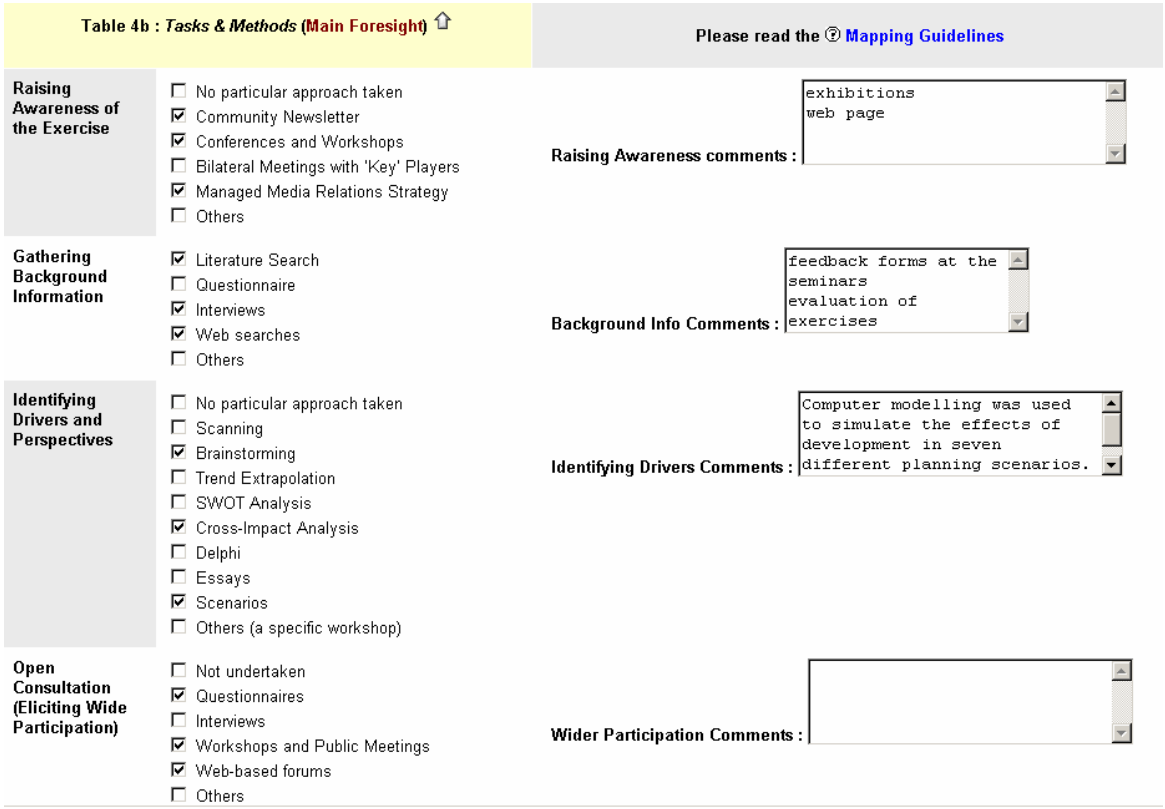


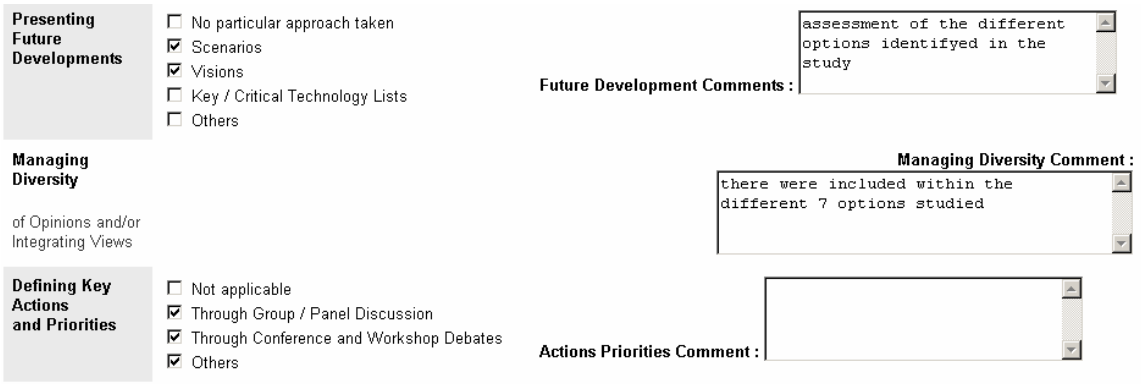
Table 4b : *Tasks & Methods* (Main Foresight) — **Please read the Mapping Guidelines**

Raising Awareness of the Exercise	☐ No particular approach taken ☑ Community Newsletter ☑ Conferences and Workshops ☐ Bilateral Meetings with 'Key' Players ☑ Managed Media Relations Strategy ☐ Others	**Raising Awareness comments :** exhibitions web page
Gathering Background Information	☑ Literature Search ☐ Questionnaire ☑ Interviews ☑ Web searches ☐ Others	**Background Info Comments :** feedback forms at the seminars evaluation of exercises
Identifying Drivers and Perspectives	☐ No particular approach taken ☐ Scanning ☑ Brainstorming ☐ Trend Extrapolation ☐ SWOT Analysis ☑ Cross-Impact Analysis ☐ Delphi ☐ Essays ☑ Scenarios ☐ Others (a specific workshop)	**Identifying Drivers Comments :** Computer modelling was used to simulate the effects of development in seven different planning scenarios.
Open Consultation (Eliciting Wide Participation)	☐ Not undertaken ☑ Questionnaires ☐ Interviews ☑ Workshops and Public Meetings ☑ Web-based forums ☐ Others	**Wider Participation Comments :**

Trends and drivers nearly always underpin Foresight exercises and these must somehow be identified and presented. A number of approaches are possible for **identifying drivers and perspectives**, some desk-based, e.g. trend extrapolation, others more interactive, e.g. brainstorming amongst an exercise's participants. Several options were provided as tick boxes, along with a comment box for elaboration.

An important defining feature of Foresight is its more or less broad participation. In Table 4a, we sought information on how participants were identified to take part in Foresight. But we also wanted to know how these people were then engaged in the exercise. In other words, what methods were used to **elicit wide participation** (beyond those intimately engaged) in Foresight? Several options were provided as tick boxes, along with a comment box for elaboration.

Lest we forget, Foresight is also concerned with thinking about the future. Various methods can be used to stimulate such thinking and debate, and to **present possible future developments**. Common among these are scenarios, key technology lists, and various approaches to forecasting and visioning. Some of these methods were provided as tick boxes, along with a comment box for elaboration.



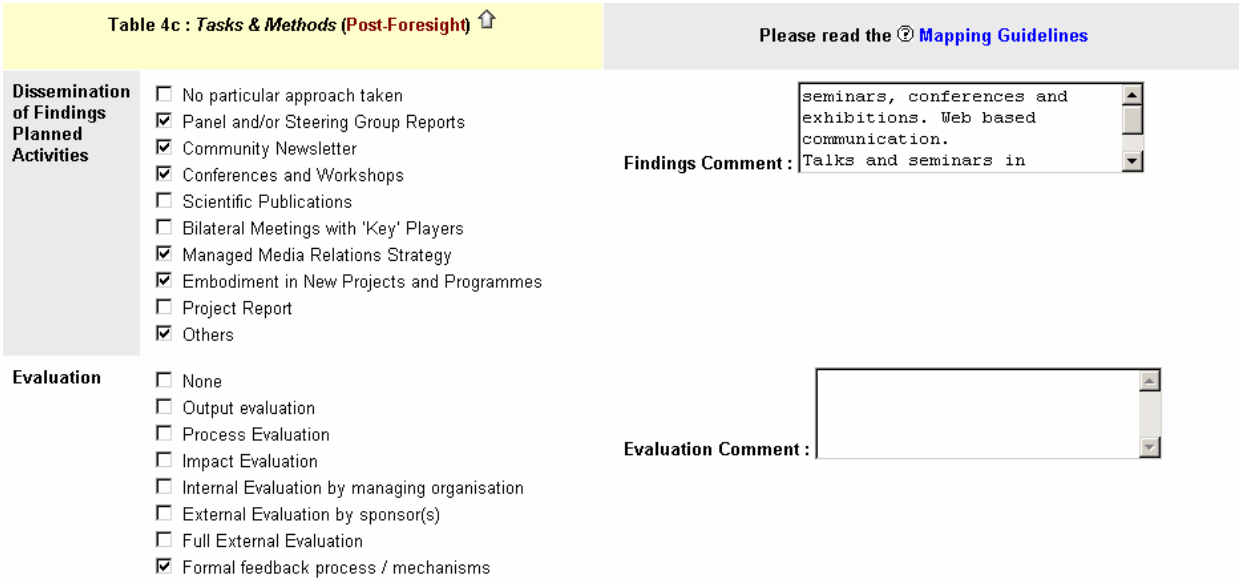
Different actors will have different views on the future (as well as on the past and present). Whilst Foresight is often promoted on the basis of its ability to bring about consensus amongst different actors, this virtue is often somewhat 'oversold'. In fact, the real virtue of Foresight is its ability to expose differences rather than to eliminate them. Nonetheless, Foresight, with its action-orientation, is usually expected to give rise to unequivocal guidance. This requires approaches for **managing diversity of opinions and integrating views**. The project team had little clear idea on how to capture such processes using indicators, so they were described in an open text field. Again, it was hoped that gathering this information in an open format during the pilot project could inform the development of some meaningful indicators at a later stage.

Finally, methods must be used to **define key actions and priorities** arising from the Foresight. Whilst these might be more or less emergent throughout a Foresight exercise, some sort of 'formalisation' into priorities and recommendations for action (usually near the end of an exercise) is almost inevitable. This can be a rather informal process – for instance, it may amount to little more than unstructured discussions between members of a panel. On the other hand, quite formal processes can also be used, such as the CSIRO attractiveness-feasibility matrix[9] or la prospective. Some of these methods were provided as tick boxes, along with a comment box for elaboration.

Table 4c: Post-Foresight

The findings of Foresight exercises, and especially their recommendations for action, are often actively promoted for some period after their production. Much of this **dissemination activity** is obviously targeted towards those who are expected to actively respond to the exercise, but there may also be some effort spent on general awareness raising. A wide variety of methods are commonly used, including reports, meetings, conferences, newsletters, etc. Some of these were provided as tick boxes, along with a comment box for elaboration.

[9] See Tegart G (1997) "A Review of Australian Experience with Foresight Studies and Priority Setting", *Nexus Paper* **2/97**. University of Canberra



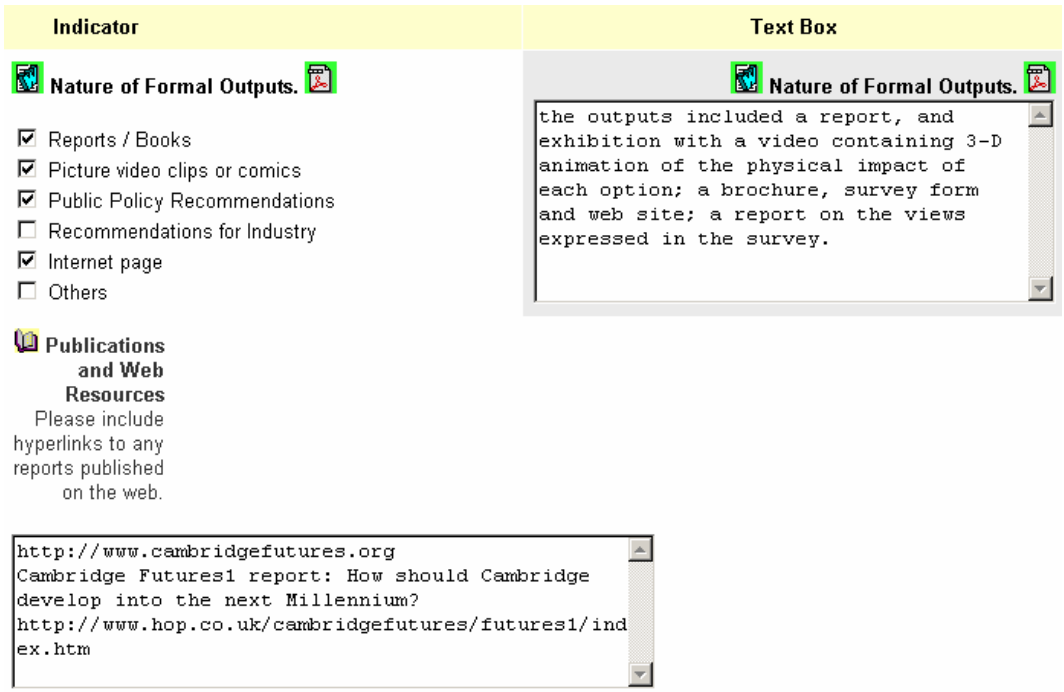
Evaluation of Foresight is often overlooked yet important for drawing lessons. Few exercises have been vigorously evaluated by external evaluators – internal review tends to be more common (though still rare). A few limited attempts have been made to assess outcomes of Foresight, but most evaluation efforts have instead focused upon processes and immediate outputs. These were presented as tick-boxes, along with a comment box for elaboration.

2.2.7 Table 5: Outputs and Outcomes

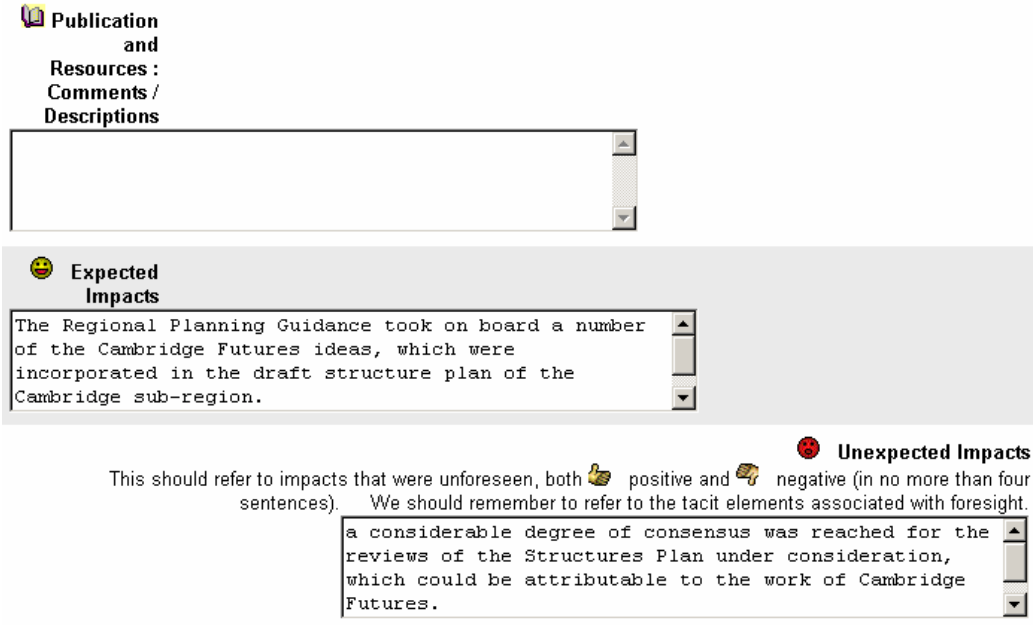
As we have already emphasised, Foresight exercises nearly always involve the production of **formal outputs**. These might include reports, books, Internet sites, and various priorities and recommendations. There was potentially some overlap here with the dissemination indicator in Table 4c. But the latter was intended to refer more to processes, whilst Table 5 was concerned with outputs. Some of the commonly anticipated outputs were provided as tick boxes, along with a comment box for elaboration. To augment this information, a separate field was created to **list publications and web resources**. There was some debate amongst project partners as to whether such publications should be obtained electronically and stored on the database web site. It was argued that hyperlinks to external sites could quickly expire as material is removed from web sites and that e-storing these reports ourselves would avoid this problem. However, it was decided that for the purposes of the pilot project, no such effort would be undertaken.

Finally, we sought to deal with the impacts of Foresight exercises. This was perhaps the most problematic area in which to identify indicators, since so little is known about the impacts of Foresight. Moreover, 'impacts' as a concept is not altogether straightforward – for example, it can refer to both tangibles (e.g. new products) and intangibles (e.g. building of trust, strengthening inter-organisational working relations, etc.), both of which can be widely dispersed across space and time. Thus, if we are to take seriously the process claims made on behalf of Foresight, we need to be looking for impacts right from the start of an exercise (including during the so-called pre-Foresight

phase). And impacts might be anticipated amongst those intimately and more loosely involved, as well as amongst those who may not have been involved at all.



Faced with these difficulties, the project team decided that impacts should be recorded in open text fields, again with the hope that gathering this information in an open format during the pilot project could inform the development of some meaningful indicators at a later stage. The one distinction we did make was between **expected impacts**, i.e. those impacts anticipated (or at least hoped for) by sponsors, managers and participants, and **unexpected impacts**.



2.3 Identifying Indicators for the Individual and Organisation Fiches

Previous work conducted by Futuribles in the mid-1990s on developing a directory of organisations and individuals working in the futures field provided a useful starting point for identifying competence mapping indicators. The principle underpinning our understanding of 'competence' was related to actual experiences in Foresight activities, whether or not these activities were mapped in the database. For this reason, the indicators used for mapping competencies refer mostly to experiences in conducting, teaching and publishing on Foresight. The indicators used for mapping organisations and individuals are shown in the Tables below and are described in more detail.

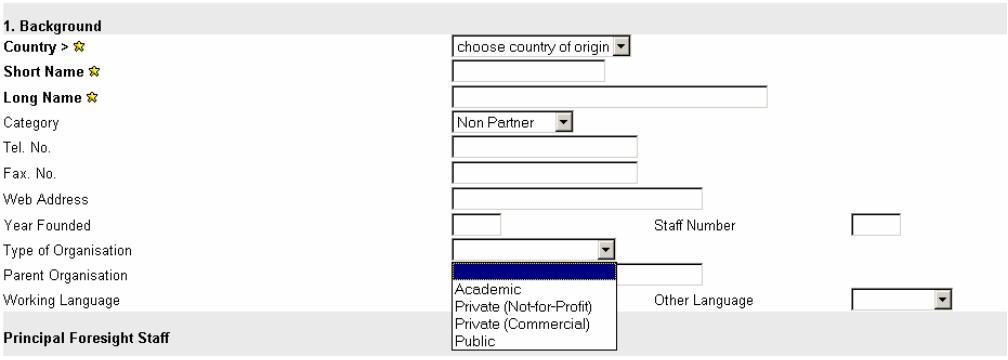
2.3.1 Organisational Fiche

The Organisational fiche was divided into three parts, as shown below.

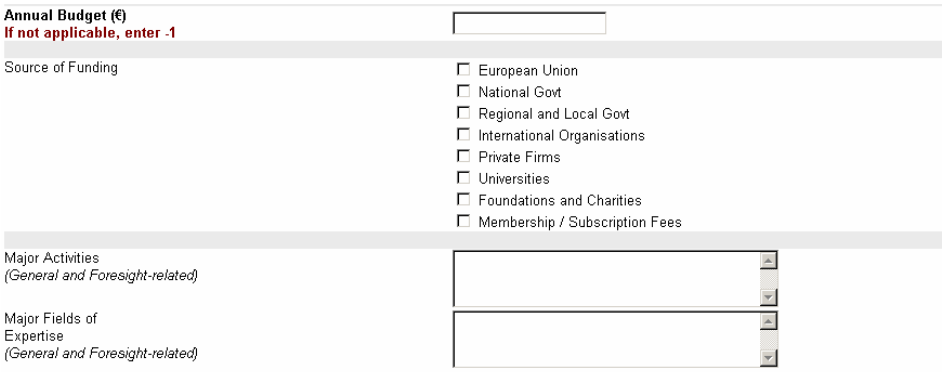
Table 2: Indicators used for mapping organisations with Foresight competencies

Background	***Knowledge Production***
Country of Origin	Production of Reports, Journals, etc.
Short Name	Organisation of Foresight events
Long Name	Academic Teaching Experience
Category	Application-oriented Teaching Experience
Telephone Number	Participation in Foresight Networks
Fax Number	Contribution to Methodological Innovation
Web Address	Links with other Foresight Centres
Year Founded	
Number of Staff	***Foresight Practice***
Type of Organisation	Management / Organisation of Foresight projects
Parent Organisation	Advising Public / Private Institutions on Foresight
Working Languages	Other Relevant Activities
Other Languages	
Principal Foresight Staff	
Annual Budget (€)	
Source of Funding	
Major Activities	
Major Fields of Expertise	

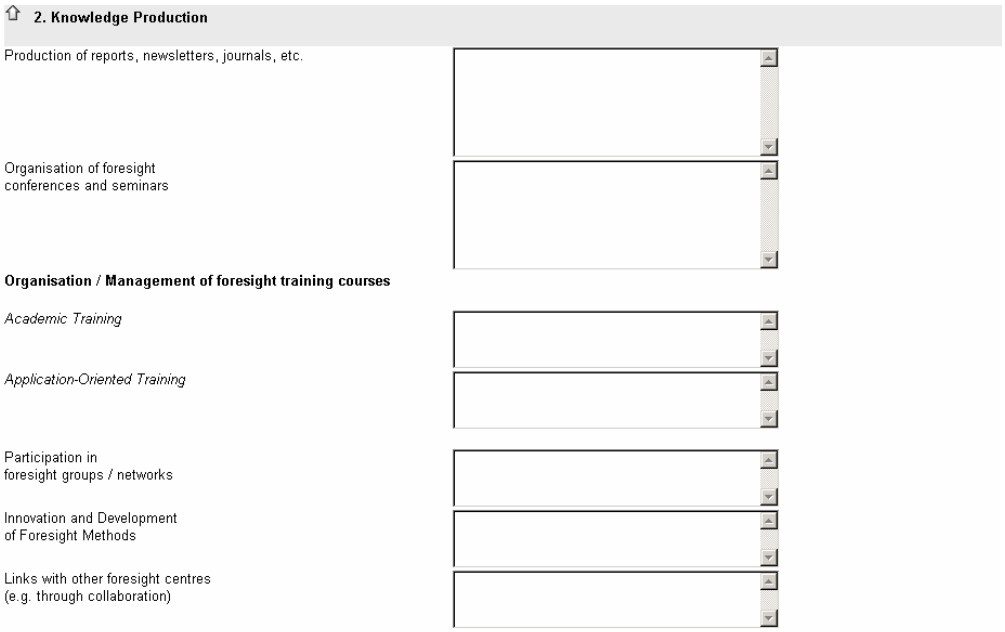
For each organisation, background information was collected, starting with country of origin, name of the organisation (long name and acronym), web address, year founded, type of organisation (whether the organisation is academic, private (non-profit or business oriented) or public), whether it is associated with a bigger organisation, and its working language. The number of staff working in the organisation and the annual budget and source of finance were also requested.



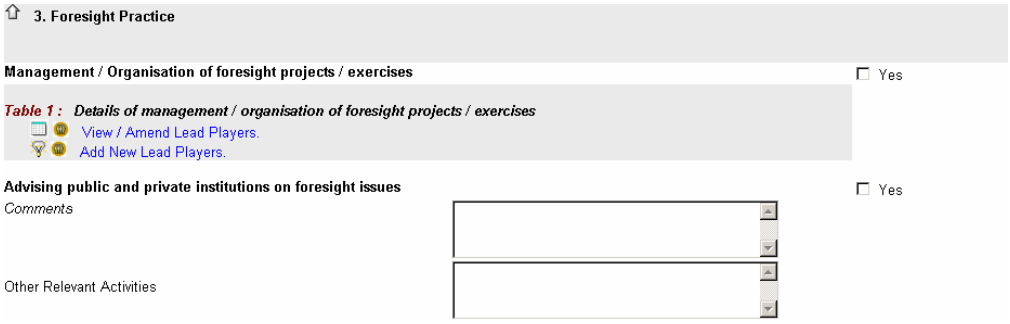
Next, we collected data on the major activities undertaken by the organisation and its major fields of expertise (including activities and fields of expertise not related to Foresight). In general, the majority of organisations that carry out Foresight activities are not necessarily dealing only with Foresight but also with issues related to policy-making and policy analysis, innovation studies, and science and technology development. This information is in any case relevant for assessing whether an organisation deals mainly with Foresight related issues or if it carries out only punctual activities. In turn, this provides some idea of how many organisations in Europe are mainly dealing with Foresight, futures studies, and prospective issues, and where centres of competencies are located.



The second part of the Organisational fiche focused upon what we have broadly called knowledge production activities. With this set of indicators, we wanted to understand the type of knowledge production and diffusion activities of Foresight organisations. One type of knowledge production consists of physical products like reports, newsletter, and journals. Another is related to the organisation of Foresight conferences and seminars to disseminate Foresight practice and results. And an important knowledge dissemination activity concerns the organisation and management of training activities (both application-oriented and academic in nature). Further indicators centre upon methodological and process innovation in Foresight, organisation and participation in Foresight networks, and collaboration with other Foresight centres (both inside and outside of Europe). All in all, these indicators give some impression of an organisation's active involvement in the development and evolution of the Foresight 'discipline'.



Finally, we collected data on the Foresight practice of organisations. We envisaged two types of contribution from organisations: involvement in the management and organisation of Foresight exercises and/ or advising others on how to conduct and use Foresight for themselves.



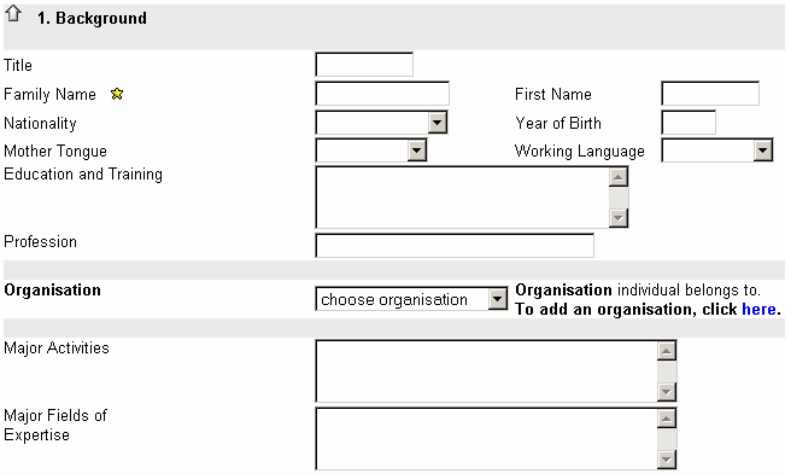
2.3.2 Individual Fiche

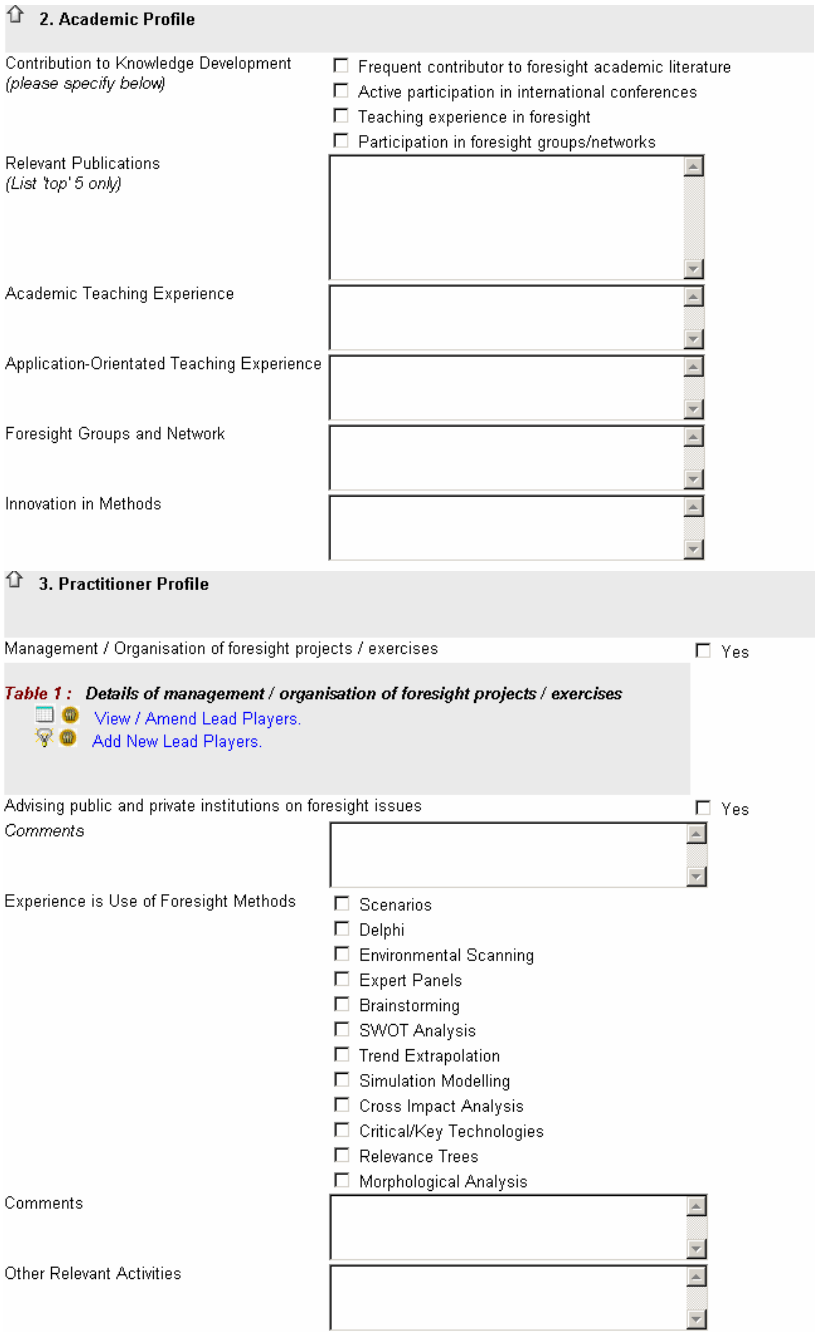
The Individual fiche was divided into three parts, as shown in Table 3 below. For each individual, background information was collected on nationality, working language, education and training, profession, major fields of activities and expertise. Their academic profile was then assessed using a set of indicators similar to those used in the Organisation fiches. Thus, we sought data on an individual's contributions to the academic literature, their active participation in conferences, their teaching experience in Foresight, their participation in foresight groups / networks, and their contribution to the development of Foresight methods and techniques.

Table 3: Indicators used for mapping individuals with Foresight competencies

Background	***Academic Profile***
Title	Contribution to Knowledge Development
Family Name	Relevant Publications
First Name	Academic Teaching Experience
Nationality	Application-oriented Teaching Experience
Year of Birth	Participation in Foresight Networks
Status	Contribution to Methodological Innovation
Mother Tongue	
Working Languages	***Practitioner Profile***
Education and Training	Management / Organisation of Foresight projects
Profession	
Organisation (Employer)	Advising Public / Private Institutions on Foresight
Major Activities	
Major Fields of Expertise	Experience in Use of Foresight Methods
	Other Relevant Activities

Finally, data was collected on individuals as Foresight practitioners. More specifically, we wanted to know whether they were involved in managing and organising Foresight projects, and whether they were active in advising public or private institutions on Foresight related issues. We also sought data on their experience in using a wide variety of common Foresight methods.





2.4 Building the electronic database

Broadly speaking, the project team had a vision of how data could be collected and presented. The challenge lay in converting this vision into reality. As already mentioned, a dedicated database and web developer was employed in the project, since none of the project partners had the time or knowledge to build the database and web interface themselves. Some of the principles and technicalities underpinning this development work are set out below.

2.4.1 Underlying principles

Because this was a pilot project, the underlying principles used in the design of the database were efficiency and flexibility. It was anticipated at the outset that the mapping framework, its entities (tables, fields) and the database schema would change radically from the conception (framework v.1) to final phase (framework v4.5) of the pilot project. Thus, holding all information in a single entity (table) was neither desirable nor feasible. As it happens, there were fewer changes than anticipated, though still enough to justify our flexible approach.

It was also recognised from the outset that the database would need to incorporate 'structured' and 'unstructured' information. The former refers to multiple choice or single selections from pre-determined lists, whereas the latter covers free-text:

- **Structured** – e.g. exercise duration and status (Table 1). This type of field could only be used when it was relatively straightforward to identify values for our indicators. Its advantages are obvious – it facilitates searching and can also be used as a basis for classifying exercises into groups.
- **Unstructured** – e.g. rationales and objectives (Table 1). Where it was too difficult or inappropriate to assign values to indicators, free text fields were used instead. These have the advantage of accommodating rich description of activities, thus providing invaluable insights into each exercise. But such fields are notoriously difficult to analyse across the database, even where dedicated qualitative software, e.g. ATLAS, is available. Thus, we tried to keep the use of such fields to a minimum.

In terms of database structure, a relational model was adopted, because it copes well with structured and semi structured information, and is flexible enough to accommodate complex hierarchical structures, which are likely to 'evolve' as new requirements are identified. Moreover, relational databases closely model concepts in the real world, in particular entities and relationships.

Other considerations that were taken into account include:

- The rapid prototyping timeframe – this necessitated an approach that would be relatively straightforward to implement. In other words, a simple database package was preferred.
- A limited software budget, which necessitated the use of 'free' software or software covered by existing licence agreements.
- The need for good web integration, since the data was to be collected through web forms over long distances across Europe and through a diversity of equipment. With this in mind, the web interface, which forms the heart of the data collection and search interface, was tested on a variety of devices. Moreover, EU wide accessibility legislation also had to be taken into account in this regard (see Annexe 2.3).
- Developer and user experience had to be taken into account – this meant that PC-based tools were used.

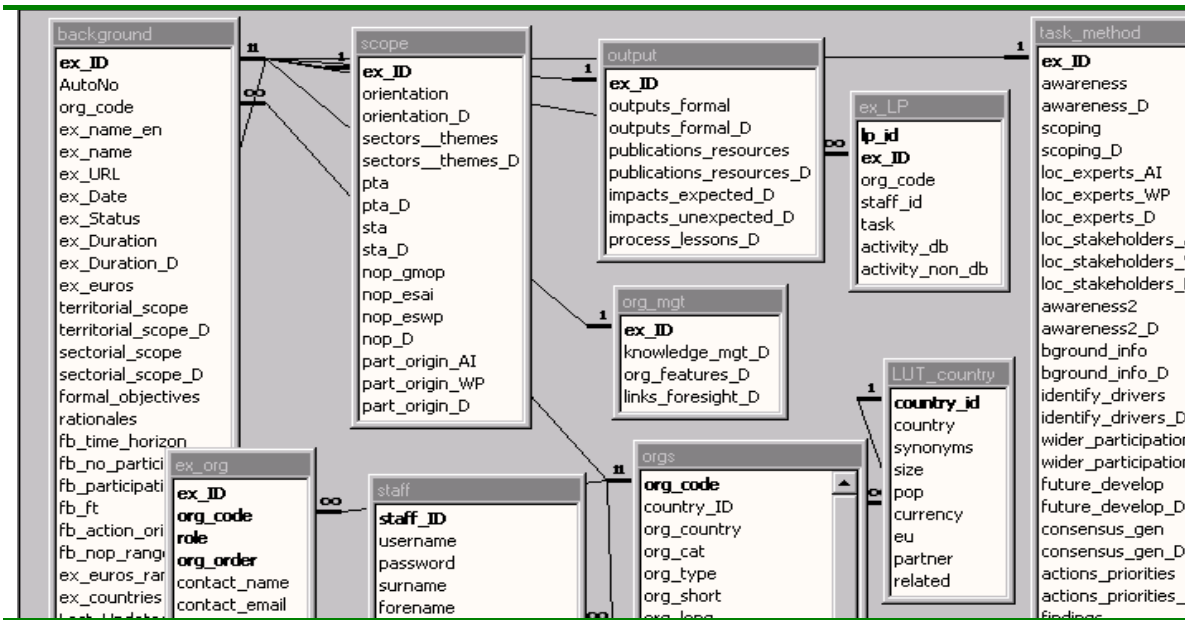
2.4.2 Building and linking fields and tables

The basic building blocks of the database are the indicator fields (structured and unstructured), which have been organised into tables, as set out in Section 2.3. Each Foresight exercise accounts for five tables of the activities database. Thus, the following structure was put in place:

- Each exercise was given an identifier (*ex_ID*) linking all five activities tables
- Each field within the database has a structured text (*field_name*) and free text or description field (field_name_D)
- Some numeric fields can be found across a few of the tables
- There were also some key fields created that uniquely identify each record in the database and facilitate the linking of records between each table (entity) in the database.

Overall, the whole database was structured into eleven tables: Activities (five), Profiles (two), Lead Players (two), Lookup Tables (LUT) (two). There were links between the activities database (mapping exercises) and profiles of organisations and individuals. In addition, the use of link tables (ex_LP, ex_org) enabled complex relationships to exist between exercises, organisations and individuals. This structure is shown in Figure 3.

Figure 3: The Eurofore database

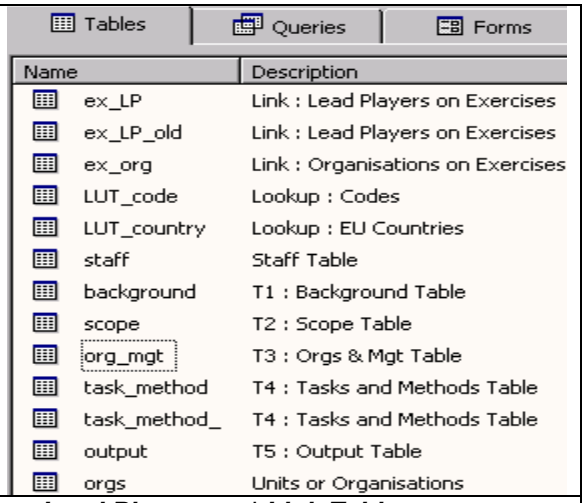


Tables in the European Foresight Database

The eurofore database contains 11 relational tables or *entities* :
Mapping (5), Profiles (2), Lead Players (2), Lookup Tables (LUT) (2)

- ***Mapping Exercises*** (Tables 1 .. 5)
  - Table 1 **- Background**
  - Table 2 **- Scope**
  - Table 3 **- Organisation & Management**
  - Table 4 **- Tasks & Methods**
  - Table 5 **- Outputs & Publications**

- ***Organisational*** and ***Individual Profiles***
  - Profiles of Organisations : orgs
  - Profiles of Individuals : staff



- ***Lead Players*** and ***Link Tables***
  - Lead Players on Exercises : ex_LP
  - Organisations on Exercises : ex_org

- ***Lookup tables (LUT)***
  - Database codes : LUT_code
    EU Countries : LUT_country

2.5 Carrying out the mapping exercise

After drafting an initial set of indicators, these were assembled into a MS Word 'form' document and 'tested' through a 'proto-study'. Testing was deemed necessary on account of the complex nature of the activities indicators (by contrast, the individual and organisation fiches were considered more straightforward and were not tested). Testing would inform us of the appropriateness of our indicators, as well as of the challenges for collecting data.

The proto-study was conducted over a two-week period in February 2002 and involved each project partner mapping two activities (preferably one territorial and one domain exercise per partner). Information was gathered through a mixture of methods, including telephone interviews, documentary analysis, web searches, and e-mail. In virtually all cases, an interview was required. In fact, if this proved unnecessary, it was because the project partners were themselves responsible for the given Foresight exercise. Interviews typically took about one hour to conduct. Taken together with collecting background material, completing the database, and contacting interviewees, it was apparent that a single exercise could take as long as one day to map. This knowledge was useful for informing the project team on how many exercises could be mapped within the confines of the project budget. Accordingly, we aimed at mapping around eighty Foresight exercises across the project.

At this point, the database had not been created, since we were testing the indicators. Thus, data was collected electronically into the MS Word 'form'. As it happens, the indicators proved to be remarkably robust with few changes necessary for the full mapping phase. We were therefore able to proceed with creating an online database into which data could be entered directly and remotely. The database was hosted at the

University of Manchester, with each project partner provided with a password for access.

Mapping guidelines were provided to each project partner (see Annexe 2) and were also available as 'help' screens in the database. A project 'flier' was also prepared (see Annexe 2) for partners to use when contacting individuals for information. The main body of mapping work was conducted over two months, during April and May 2002, using the same data collection approaches that had been used in the proto-study, i.e. interviews, documentary analysis, etc. As anticipated, each exercise took the most part of a single day to map comprehensively. Different project partners used different routines for collecting the Foresight activities data. A typical routine (with some variations) was as follows:

- Relevant web sites were searched and paper documents obtained. Information from these sources was transferred into the database. In all cases, this data was insufficient to complete fully the database fields, but in many instances, it provided a good starting point.
- An individual involved in organising and/or managing the given exercise was then contacted for further documentation and an interview. Virtually all interviews were conducted on the telephone and typically took around one hour. Many project partners sent the mapping guidelines and MS Word version of the database to their interviewees in advance. They could then go through the database together on the telephone. A few project partners preferred to give (known and trusted) interviewees direct access to the database to complete the fields for themselves online (though this was always accompanied by a telephone call). However, this practice was not encouraged across the project due to the risks involved: it was all too easy to press the 'wrong button' and thereby lose data, whilst completing the database required some familiarity with its design and functioning.
- As a matter of good practice, some partners sent completed records to their interviewees for checking, validation, and, most importantly, additional gap-filling data. However, this was not a straightforward task, since the 'view' screens of the database were unattractive and lacked clarity at this point in time, making them unsuitable for printing out. An alternative strategy was to give database access to interviewees for checking, but again, this was not encouraged for the same reasons as stated above. Thus, some gaps remain in a number of records.

As mentioned earlier, given resource constraints, only a fraction of activities were covered in many countries, for instance in the UK, France, Germany, Finland and the Netherlands. On the other hand, some on-going Foresight exercises were identified although the more detailed data are still missing or incomplete. (The data can hopefully be completed during the second round of activity mapping.) The important thing was to achieve a good spread across territorial levels and domains, and to try to map exercises of various shapes and sizes. Because most project partners had to map only a handful of exercises, the tendency was to map those activities that were already known to them. This is a critical point, since it means that the project was unable to pilot sufficiently the *process of identifying exercises* to map. This will be discussed in more detail in Section 3.

During May and June 2002, we focused upon filling the individual and organisation fiches. These indicator sets were relatively straightforward and self-explanatory and were not subjected to any sort of proto-study. We had already started to collect some basic information (e.g. name, web and postal address, etc.) on those organisations and individuals attached to the Foresight exercises we were mapping. As a result, more than 100 individuals and around 150 organisations have an entry fiche in the database. However, it was infeasible to collect data on all of these within the confines of the project time scale and budget. In many instances, it was also undesirable, particularly for those organisations that are sponsors and promoters of Foresight exercises, since these tend to have few Foresight competencies for mapping. It was therefore decided that each project partner would take responsibility to collect data for two or three individuals and organisations. Consequently, whilst there appears to be many individuals and organisations mapped in the database, in reality, many of these fiches are empty and awaiting data collection. We make proposals to rectify this situation in Chapter 5.

Turning to data collection, a MS Word 'form' document was also prepared for these fiches (see Annexe 2). Many project partners distributed this document (in paper and electronic formats) for individuals to complete themselves. Alternatively, some partners had individuals fill in their own fiches online, but this was subject to the same risks mentioned above. Few telephone interviews were conducted to collect data, although project partners had to be at hand to answer queries. Again, a key limitation in our approach was an inability to fully pilot the *process of identifying organisations and individuals* to map. This was not as critical as the same problem with the exercises, since the exercises themselves were 'automatically' highlighting names of organisations and individuals for competence mapping. But the project team were aware that confining ourselves to mapping the competencies of only those individuals and organisations attached in some way to mapped exercises would result in important players being missed in Europe. The narrow scale of the pilot project has exacerbated this tendency, since only a fraction of Europe's Foresight exercises have been mapped. This challenge will be discussed more fully in later Sections of this report.

3. Methodological Reflections

The key rationale for this project was its learning potential, thus its pilot status. Learning occurred at several levels and much of this is in fact embedded in the database. In this section, we draw out lessons learnt regarding:

1. Boundary issues, i.e. on what should/should not be included in the database
2. Appropriateness of indicators used in the database
3. Appropriateness of the various information gathering practices used in the course of the pilot

3.1 Boundary issues and the inclusion of activities, individuals and organisations

Since the pilot project attempted to map only a fraction of the activities and competencies in Europe, the parameters associated with the boundary issues outlined in Section 2.1 were not tested to their limits. Nevertheless, they did provide useful guidance to the project team in identifying suitable exercises for mapping. In the UK, Germany, France, Netherlands, and Scandinavia, project partners could easily rely upon their own knowledge and contacts in order to identify suitable activities and competencies. The main exception to this situation was in Southern and Eastern Europe, where it was often difficult to identify Foresight activities and competencies suitable for mapping. This may be because fewer such activities and competencies reside in these countries. But a few partners who had responsibility for mapping activities and competencies in countries other than their own faced similar problems. This might have been for similar reasons, i.e. the lack of relevant exercises. But it may also be explained by language barriers, unfamiliarity with local conditions, and/or relatively undeveloped information infrastructures (e.g. web sites) that cover this type of activity. In all, some 84 exercises were mapped by October 2002 (see Annexe 1 – note that this figure has since crept up to around 90 by December 2002). Some are inevitably better mapped than others for a variety of reasons, e.g. data availability, dedicated time and effort of project partners, etc.

Turning to organisations, these were mapped largely according to their association with the activities we had mapped. This was deliberate – our definition of competencies depended upon real experiences with Foresight. Thus, the mere entry of an organisation as a 'General Managing Organisation' (GMO), sponsor, or promoter resulted in it becoming part of the database. There were, however, a few problems with this approach: first, as we were mapping only a fraction of activities in Europe, this resulted in important Foresight organisations being missed. This is not critical for a pilot study, but it is an issue that needs to be addressed in an up-scaled database.

Secondly, the database as constructed listed all entered organisations together, whether these were GMOs, sponsors or promoters. In other words, it failed to sufficiently distinguish between those with real Foresight competencies and those who might be customers or sponsors of Foresight results. Technically, this is quite simple to fix, but the question arises as to what data to collect on sponsors and promoters. Clearly,

seeking information on their Foresight competencies will be nonsensical in most cases. But it is likely that users of the database would desire to know more about these organisations, especially their motivations for supporting Foresight and any use of results. We will discuss this possibility further in Section 5.

The third and final problem is that whilst there appears to be 154 organisations mapped in the database (as of October 2002), the true picture is somewhat different. 154 organisations have indeed been given a fiche in the database, but for the most part, these remain largely empty and underdeveloped. There are a few reasons for this: first, and returning to our previous point, approximately one-third of the organisations entered into the database are Foresight users with few Foresight competencies. Therefore, our indicator framework is unsuitable for this group. Secondly, the project team was given little dedicated time or resource to collect this data for the remaining records. Most project time during this phase was dedicated to the more challenging task of collecting data on Foresight activities. As a result, it was agreed that each project team member would seek to collect full data on only a couple of organisations in their own country in order to test the indicator framework. This means that less than 30 organisations have full records in the database at the moment. Section 5 will discuss how this number could be quickly enhanced at little cost.

Our approach for mapping individuals was slightly different again. Thus, whilst we relied upon the identification of relevant individuals through their association with activities (and, by extension, organisations), project team members were also invited to nominate individuals whom they thought should have a fiche in the database. This was because there are many futures and prospective studies people who have those competencies important to Foresight, but that have not been visibly involved in the Foresight activities mapped. Unfortunately, only a few project partners provided names, so fewer individuals have been given a fiche than was originally anticipated. In all, 113 individuals have entry fiches (as of October 2002). However, most of the problems concerning organisational fiches (as outlined above) also apply to those of individuals, i.e. not all important individuals have been given an entry, whilst for those that have, little data has been collected. Again, Section 5 will discuss possible remedies for improving this picture.

3.2 Appropriateness of indicators

As is common to all attempts to 'fit' complex socio-political processes (such as Foresight) into the confines of a database, important aspects of some exercises were not captured whilst in other instances, the indicators called for the collection of data that did not exist. The latter was particularly problematic with small exercises, since the database was constructed to accommodate a wide variety of activities, including more complicated large exercises. At the same time, it was often difficult to capture the essence of exercises using only the closed structured fields in the database. This was anticipated and, in our view, unavoidable, but was nevertheless frustrating at times. It was for this reason that comment boxes were provided throughout the database for further elaboration and explanation. These were useful for giving a richer picture of individual exercises, but are notoriously difficult to analyse across a database.

Despite these challenges, the project team found the indicators to be satisfactory overall. Specific issues that may need to be addressed when the database is up-scaled are outlined below.

In Table 1 (Background):

- On the Foresight Barometer, the rather subjective nature of the options, especially those concerning "diversity of participants" (wide, medium, narrow) and "direct action orientation" (explorative, visioning, planning), made them difficult to interpret in a consistent manner across the whole pilot study.
- Financial costs proved particularly problematic – sometimes this information was deliberately withheld, other times interviewees did not know the costs. Although anticipated by the project team, the 'hidden' costs associated with Foresight proved controversial – some interviewees (and project partners) thought that ignoring these gave a too distorted picture of the 'real' costs of Foresight. The result of these problems is that less than one-third of the exercises have financial costs indicated.
- There was some repetition in data entry, especially surrounding information on organisations and individuals (Table 1c). It also proved difficult to remove records if mistakes had been made. All of this was rather irritating for those having to enter the data, although these problems have since been rectified.
- The role of 'promoter' was rather fuzzy for most members of the project team, and most chose to ignore it.

In Table 2 (Scope):

- There was sometimes some confusion over the "List Sectors and Themes Covered", since this information seemed to be collected already in Table 1.
- Some project partners found it difficult to discriminate between "primary" and "secondary" target audiences and questioned the need for such a distinction.
- Information on the origins of participants was also very difficult to obtain with any precision. Some project partners have refrained from completing this section, whilst others have had to provide educated guesses in many instances. An added difficulty related to distinguishing between those participants with "active involvement" and those who were part of the "wider pool".
- The "Number of Participants" field seems to be repetitive given that this is asked in the Foresight Barometer. On the other hand, a breakdown is sought here, although this information was often difficult to obtain with any precision. It would have been preferable for this data to be collected as a set of ranges rather than trying to obtain absolute figures – interviewees seem to have fewer problems giving 'ball-park' (approximate) figures.

In Table 3 (Organisation & Management):

- The "Knowledge Management" field was sometimes difficult to operationalise, especially with smaller exercises where few, if any, formal arrangements were put in place to manage information flows.

- This table mostly consists of unstructured text fields, which are difficult to analyse. Attempts should be made to capture some of this data to create values for more pointed indicators in any up-scaled database.

In Table 4 (Tasks & Methods):

- The database was designed in such a way as to accommodate Foresight exercises of all shapes and sizes. Inevitably, this resulted in some redundancy for smaller scale exercises. This was particularly acute in Table 4, where the division of exercises into "Pre", "Main", and "Post" phases seemed to be rather excessive for small exercises. Moreover, many of the tasks listed under these phases tend to be conducted rather informally in smaller exercises, making them difficult to detail in the database.
- With regards to "Locating stakeholders and experts", it was often difficult to collect data that could discriminate between those with "active involvement" and those from the "wider pool". In many exercises, no such distinction exists. Even where it does, it is rare for different approaches to be used to locate those actively involved and those with a looser link to an exercise. Thus, this distinction might be redundant.
- The distinction between "stakeholders" and "experts" was nonsensical in a lot of exercises – for this reason, the project team has proposed that these fields should be merged.
- There is potential for some repetition between "Dissemination of Activities" in Table 4c and "Nature of Formal Products" in Table 5, even though the former is supposed to refer to the channels of dissemination. If this distinction were to be maintained, then some review of the values for each indicator would be advisable.
- One member of the project team thought that more information on some of the techniques used rather than just an indication of their use might be of interest to potential users. By contrast, another project team member thought that Table 4 was overly concerned with the subtleties associated with an exercise at the expense of providing sufficient information on organisation and conduct issues. On both counts, the database provided plenty of opportunities through comment boxes to elaborate on methods and organisational issues. However, as we have already said, open text fields are difficult to analyse.

In Table 5 (Outputs & Outcomes):

- Interpreting the meaning of 'impacts' was not straightforward, given their spatial and temporal distribution. Thus, obtaining reliable information on impacts proved difficult.
- There was a feeling that the database paid insufficient attention to problems faced in exercises – the impressions given by the indicators appear to be value-free. It was therefore suggested that an extra indicator field be added, which would encourage interviewees to reflect upon the strengths and weaknesses of the approach they had followed. This indicator was given the name 'process lessons', but was not added to the database until after the majority of data had been already collected.

All of these points need to be borne in mind when the indicators are reviewed before up-scaling the Foresight monitoring / mapping activity. In addition, potential users of the database need to be involved in reviewing the indicators before up-scaling takes place – we will say more on this in Section 5.

As regards the organisational and individual fiches, few problems were encountered, probably because these indicator sets are far simpler to interpret and to collect data for. However, the fact that less time and effort was spent on mapping organisations and individuals might also go some way to explain the relative absence of major problems.

3.3 Data collection strategies

As we have already noted in Section 2.5, a variety of data collection strategies were employed across the project, sometimes by the same project partners. For the activities database, an interview was always required (unless the project partner was herself responsible for managing an exercise or could trust a colleague responsible for the exercise to have a direct access to the database - in the latter case personal / telephone / email consultation was still needed to get the work done in a proper way). In fact, collecting data on Foresight activities was far more arduous than most project partners had anticipated at the start. Conducting the proto-study was invaluable in this regard, since it permitted the project team to realistically assess what could be achieved within time and budget.

Given the relative complexity of the activities indicators, the guidelines were indispensable, although it would have been preferable for them to appear as 'pop-up' boxes adjacent to the relevant database fields. But even with the guidelines, some project partners interpreted a few of the fields differently – this might suggest room for tightening up on the guidelines, but problems were mostly encountered when faced with trying to account for exercise characteristics that were not easily captured by database indicators. As we have already noted, this is a common problem with databases – trying to shoehorn 'reality' into a structured framework is often problematic, especially when the aim is to describe complex social phenomena.

Some project partners encountered problems in getting people to respond to the call for information. The project flier and indicator guidelines were often sent in advance of any interview – this was intended to provide background information, but in some instances, the apparent complexity may have put off some people (though we have no hard evidence of this, since those who fail to reply to requests for information rarely state why!).

The language used for some indicators was somewhat esoteric, even to those already quite familiar with Foresight. Language will have to be reviewed when the database is up-scaled, especially since many of its potential users may not be as familiar with Foresight. The universal use of English, whilst having clear advantages, may also have been a barrier in this respect.

What clearly emerged from completing the activities database was that this task could not be left to people to do for themselves. Indeed, if a self-completion strategy is eventually opted for, then the activities database will need to be significantly simplified.

As the database currently stands, an experienced interlocutor is required to extract key information from interviewees and documentation. An important question here is whether this extra effort really amounts to sufficient value-added to lend it justification. This can only be answered by the user community, which will be the final arbiter of what is considered useful / redundant in the database.

Turning to the organisational and individual fiches, data for these was collected, for the most part, through self-completion MS Word 'templates'. A MS Word 'form' was sent out (usually by e-mail) for individuals to complete about themselves and their organisations. Some of these people called project partners for clarification of indicators, but this was not the norm. This turned out to a reasonably efficient way to collect data on organisations and individuals, although it would have been more helpful if the MS Word 'form' had contained a macro that 'dumped' data directly into the corresponding database fields. As it was, any data collected using Word templates had to be manually cut and pasted into the database.

All of the points raised in this section highlight issues that emerged during the conduct of the pilot project. As such, they provide useful pointers to challenges that will be faced in any continuous mapping activity. However, one important aspect of any future mapping activity failed to be sufficiently piloted in this project – the means for *identifying* appropriate activities, organisations and individuals to be mapped. Because the project called for only a fraction of European activities, organisations and individuals to be mapped, project partners tended to rely upon their existing knowledge of the Foresight landscape when identifying targets for mapping. They did not need to look further than this to fulfil their contractual obligations. On the other hand, some project partners were not so lucky and had to try much harder to identify suitable exercises for mapping (although with mixed success, especially in southern Europe). No doubt, there are lessons from these efforts that we will seek to incorporate in future mapping arrangements. As it is, we make a number of suggestions in Section 5 on how more exercises, organisations and individuals could be identified across Europe for mapping.

A final point concerns the costs associated with coordinating a relatively large team of international researchers. It turns out that these costs were lower than might be expected, since project team members had an extensive track record of previous and ongoing collaboration (both through ESTO and other project platforms), as well as excellent knowledge of Foresight. This is an important consideration to be borne in mind when the database is up-scaled (see Section 5).

4. Using the Database for Search and Analysis

The rationale for collecting so much data on Foresight activities and competencies was that it could be usefully deployed by policy makers, analysts and academics, and Foresight practitioners and 'entrepreneurs'. For this to come about, data collection is just one part of the challenge. As much attention needs to be given to data presentation. In this section, we present the web-based search interface that allows access to the collected data. We also devote considerable space to some rudimentary analysis of the database, in order to demonstrate its potential as a research tool.

4.1 Search Interface

A basic search interface that uses many of the features of the database entry fields has been developed. The search interface (browse, search, map) also borrows from other places, including the UK Higher Education census project KINDS (http://www.kinds.ac.uk), CORDIS, and the IPTS web site. Considerably more effort will need to be put into developing a more sophisticated search interface, but the pilot status and lack of resources in this phase means that we have refrained from expending this effort at the moment. The search interface thus developed is, we hope, an interim, and that more time and resources will be spent on this later.

Essentially, the data is presented in four screens:

- Exercise Summary Record (ESR), which uses a selection of data entered in Table 1 (Background) and Table 5 (Outputs and Outcomes) of the activities database;
- Exercise Full Record (EFR), which presents the data as entered in Tables 1-5 of the activities database;
- Organisation Fiche (OF), which presents the data as entered in the organisational fiche database; and
- Individual Fiche (IF), which presents the data as entered in the individual fiche database.

The database can be searched in three ways:

- Map search, whereby all Foresight activities, organisations and individuals from a given country can be identified;
- Subject search, whereby a free-text word or phrase can be searched. This search can be filtered by looking for exercises of a specified duration or of a specified direct action orientation; and
- Keyword search, whereby a free-text word or phrase can be searched. This search can be filtered by looking for exercises of a specified time horizon or of a specified use of formal techniques or of a specified scope (orientation and coverage).

There are a few key limitations with these search routines that must be highlighted:

- Both the subject and keyword free-text terms search only a limited number of indicator fields. Thus, none of the open text field boxes and only some of the structured fields in the database are searched. Clearly, more wide-ranging search routines will need to be developed when the database is up-scaled and migrated.
- Whilst the use of filters, borrowed mostly from the Foresight barometer, seems to offer a good way to focus searches, at the moment they can only be used singly rather than in combination. Thus, it is not possible to search for exercises with a 10-15 year time horizon that have a Science & Technology orientation. The current search routines allow the user only to search against one of these filters at any one time.
- Finally, insufficient attention has been paid to searching the Organisation and Individual Fiches. At the moment, these can only be searched through the rather limited map search. None of the indicator fields, whether structured or unstructured, can be searched. Given that many of the OFs and IFs remain empty, this is not a serious problem at the moment. However, once these fiches begin to fill with data, appropriate search facilities will need to be developed.

As a concluding remark, it is clear that much more could be done to improve the search interface to the database. However, much of this work has been put on hold until the next phase of the project, where it is hoped resources will become available to develop the we interface.

The following screenshots illustrate the possible steps involved in searching the database. It also illustrates and explains the contents of an Exercise Summary Record (ESR).

http://les1.man.ac.uk/eurofore

EuroFore main menu.

Choose 'Search the Eurofore Database'.

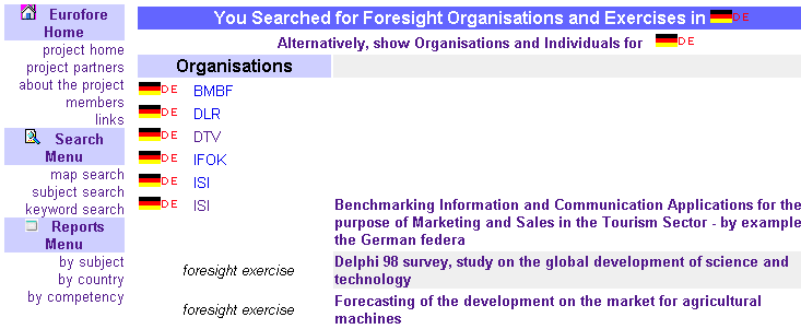
Search Menu

- Map search
- Subject search
- Keyword search

Map Search

- Find foresight exercises
- Find Organisations + Individuals
- Clickable map of Europe

Foresight activity in Germany



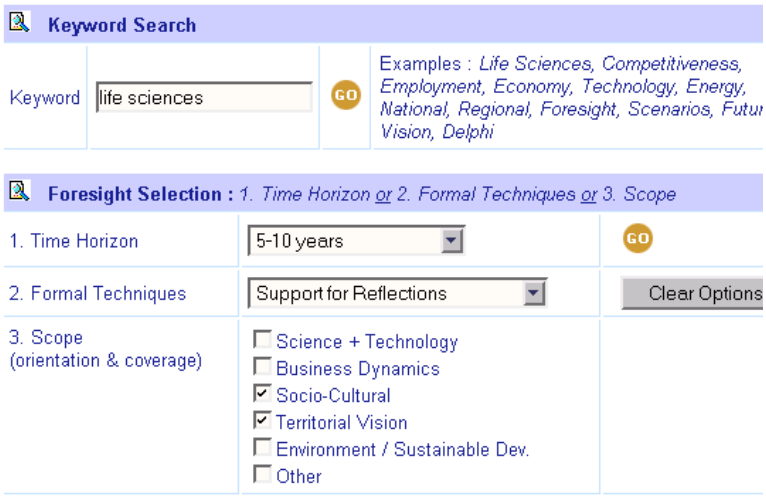
Keyword Search

Enter a keyword (e.g. life sciences or futures)

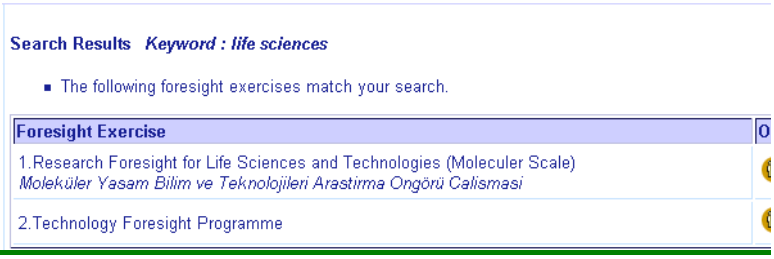
Foresight Selection :

Filter on :

1. Time Horizon
2. Formal Techniques
3. Scope (multi choice)



Result of searching for 'Life Sciences'.



Select summary record for this foresight exercise.

Exercise fiche is broken down into sections :

- Background Information
- Foresight Barometer
- Organisation & Management
- Outputs & Publications

Formal Objectives

Rationales

Foresight Barometer

Outputs

Publications and Resources

Expected and Unexpected Impacts

Links to on line publications and external resources are highlighted in blue.

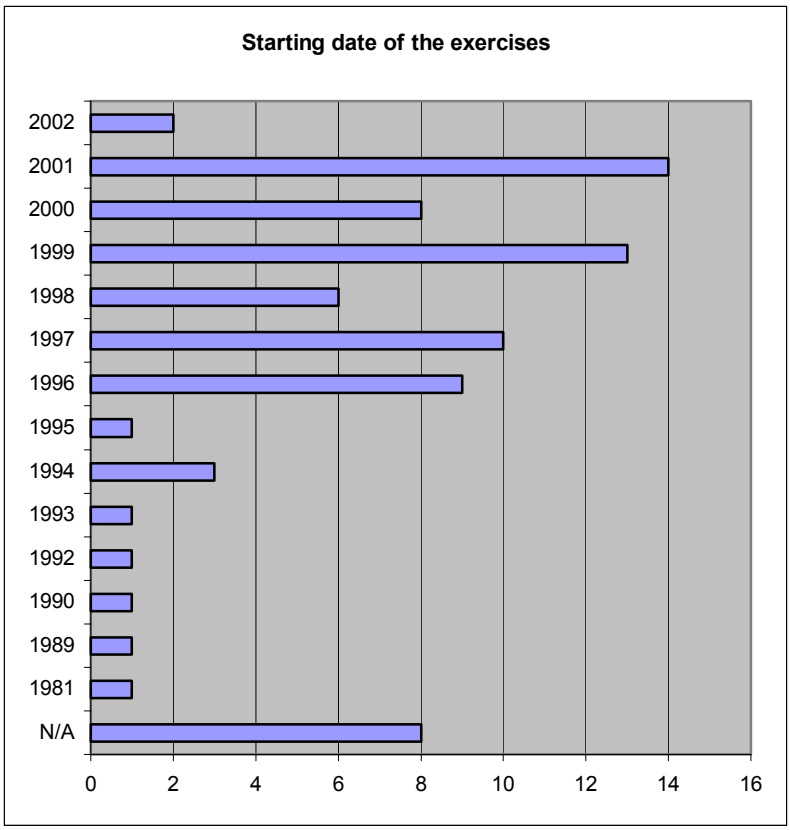
4.2 Database analysis

The information contained within the database is likely to be useful in its own right, especially for those wanting to identify activities and competencies of one sort or another, i.e. for 'first order' information demands. But the database also offers another level of usefulness – as a tool for gaining insight on an emerging Foresight community in Europe, i.e. for 'second order' information demands. This strategic level of analysis is crucial to the European Commission if it is to successfully intervene in the development of a European Foresight community. But it is also of interest to other Foresight analysts and practitioners – for example, it allows us to ask such questions as:

- Are some approaches to Foresight more common than others?
- What dependencies exist between the various characteristics of Foresight (as captured by our indicators)? For example, to what extent is an exercise's direct action orientation dependent upon its time horizon? Scores of potential dependencies (and hypotheses) could be investigated in this way by cross-tabulating our indicators.
- Can 'types' of Foresight be identified and characterised? If so, to what uses could such a typology be put?
- How has Foresight evolved since 1990, for example, in terms of its approach, domain, methodology, etc?
- Do specific organisations and/or individuals act as vectors for the diffusion of ideas and approaches on the conduct of Foresight?
- Are there any obvious gaps in Foresight competencies (e.g. Foresight evaluation) that the European Commission should attempt to fill?

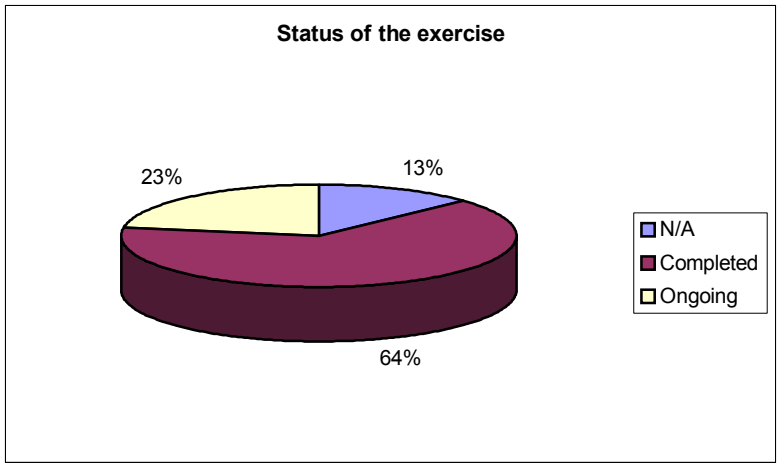
We have not attempted to answer these or other questions during this pilot phase, since our populations of activities, organisations and individuals are rather patchy, the quality of our data is variable, and some of the most interesting data is contained within open-text fields that we have been unable to statistically analyse. However, to demonstrate this promising use of the database, we have sought to conduct some rudimentary analysis of the 84 mapped exercises. Specifically, we have measured value frequencies across all structured indicator fields in the activities database. The results are presented as bar and pie charts in the following pages. Due to relatively few Organisational and Individual fiches containing data, we have not attempted any analysis of these parts of the database for the time being.

4.2.1 Table 1a: Background

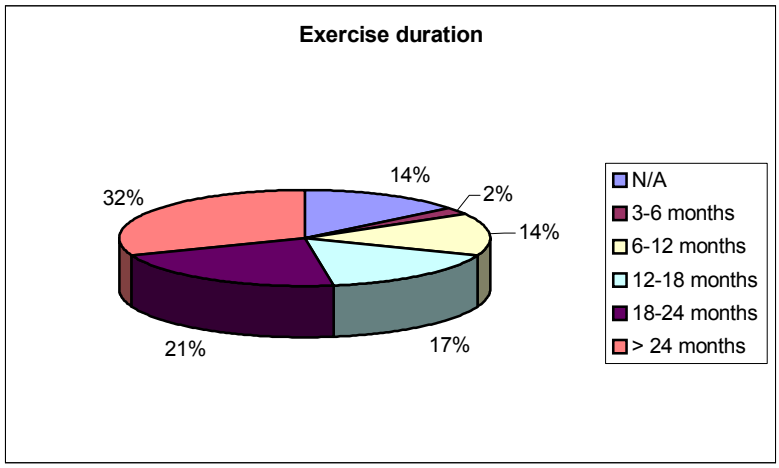


The starting date for most of the mapped exercises is from 1996 onwards. This is in line with the project's intentions to map only contemporary activities. Indeed, locating and obtaining data on exercises before this time is quite difficult – documentation is hard to come by, web sites are non-existent, and memories have largely faded. What is interesting to note is that Foresight seems to be as popular as ever, with 2001 showing the largest number of mapped exercises. Of course, as we have mapped only a fraction of activities in Europe, we must be careful on our interpretation of these results. For instance, it is likely that more exercises were initiated in 1998 and 2000 than is indicated here.

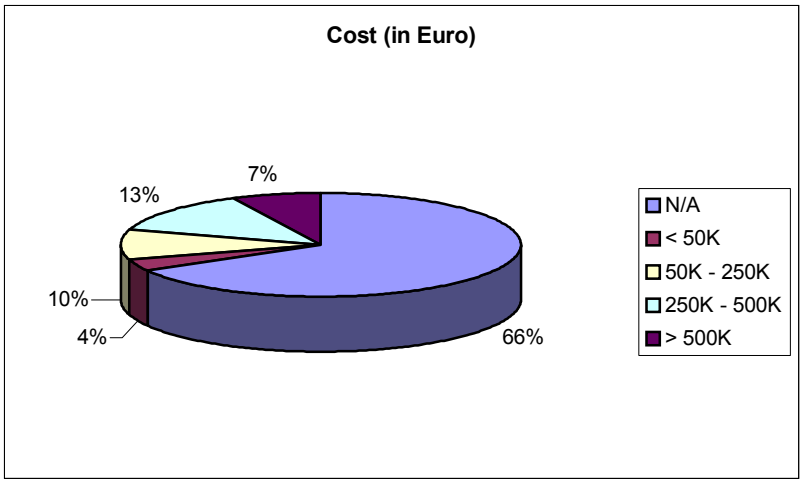
Of the 84 activities mapped, almost two-thirds have been completed whilst around a quarter are still ongoing. This is in line with expectations given the start dates (see above) and duration (see below) of the activities mapped. The status of some 13% of exercises could not be determined. In these cases, the future of exercises tended to be uncertain. This is a not uncommon situation for Foresight exercises after they have reported their main findings.



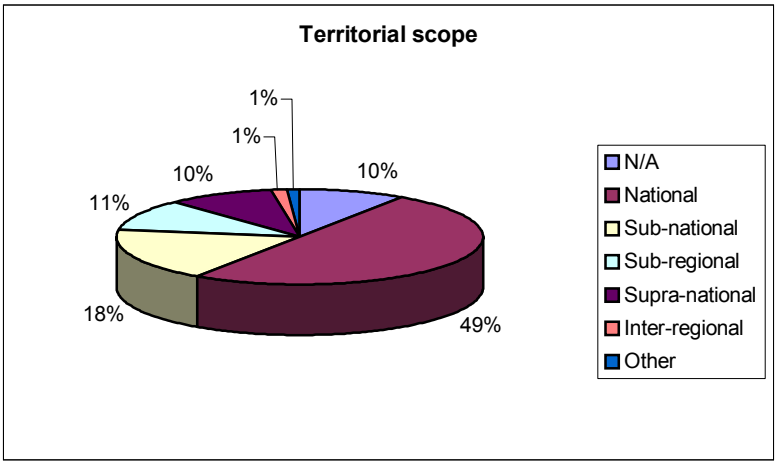
The chart below shows that more than half of the 84 exercises mapped had a duration longer than 18 months, with around one-third of the total taking longer than two years to conduct. In other words, Foresight requires a significant commitment of time. Indeed, only 16% of exercises had a duration of less than one year. Again, the duration of some exercises was difficult to determine, reflecting the uncertainty of their status (see above).



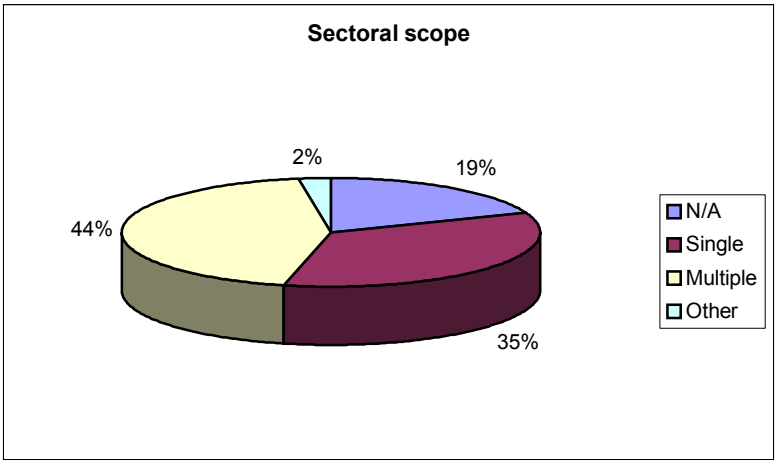
More than anything else, the chart below illustrates the problems faced by the project team in obtaining financial data, with two-thirds of exercises having no data. Of those where data was available, 20% of the 84 mapped exercises cost more than 250,000 euro, with 7% costing more than 500,000 euro. Only 4% of exercises cost less than 50,000 euro. In other words, Foresight exercises would seem to require considerable financial resources.



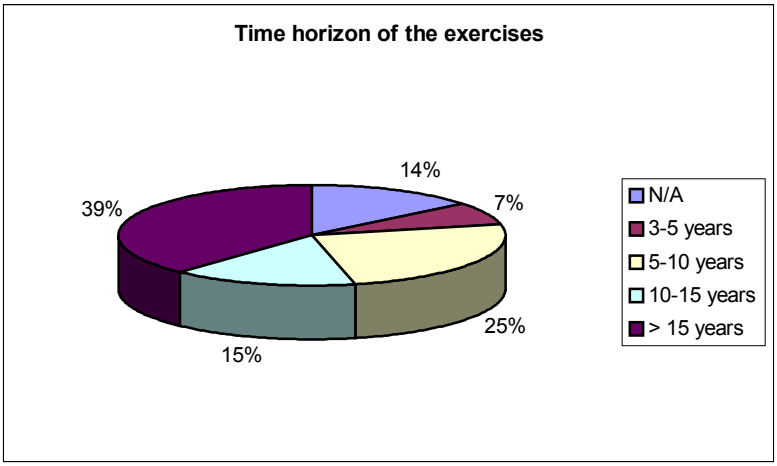
As the chart shows below, almost half of the exercises mapped are national in scope. This is not to say that they all resemble the large national exercises that are commonly known about; rather, many national exercises focus upon a single or small number of domains (sectors and/or themes). Around 30% of exercises are sub-national or sub-regional, whilst 10% are supranational.



Around one-third of the exercises mapped are focused upon a single domain area, i.e. a single sector or theme. By contrast, just under half the exercises focused upon multiple sectors/themes. Surprisingly, this information is missing in almost 20% of the activities, perhaps due to misunderstandings within the project team of the meaning of this indicator.



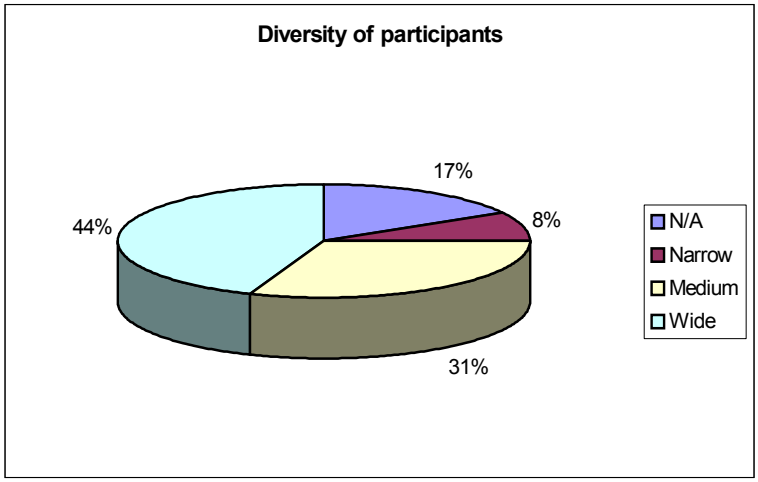
4.2.2 Table 1b: Foresight Barometer



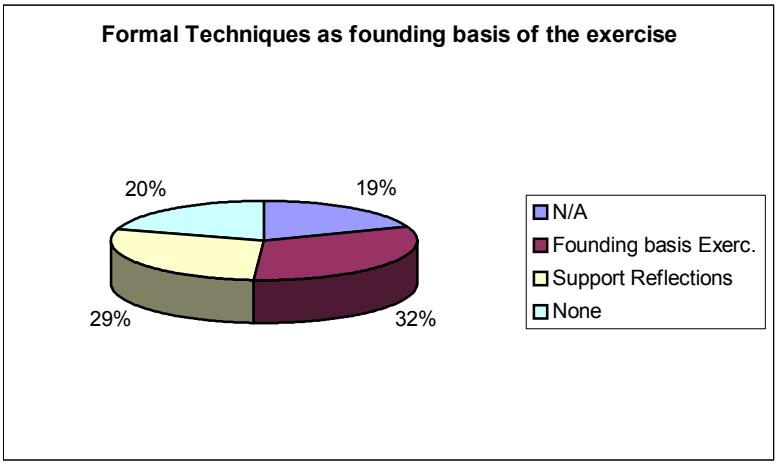
Of the 84 exercises mapped, almost 40% had a time horizon greater than 15 years. This figure is evidence of the relatively high 'foresightness' of the exercises mapped, especially since only 7% of exercises had a time horizon of less than 5 years.

The data on No. of Participants is shown in Section 4.2.3.

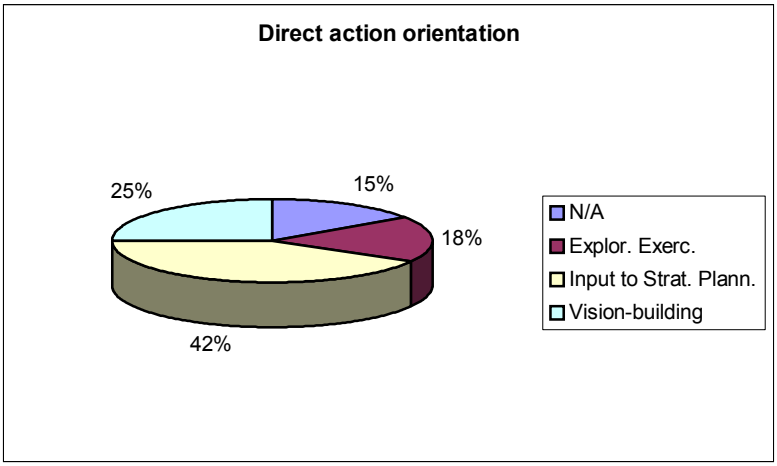
Three-quarters of the exercises mapped were judged to have a wide or medium diversity of participants, with only 8% being narrow. Again, this shows the relatively high degree of 'foresightness' of the exercises mapped in the pilot project. However, with data missing in 17% of exercises, the difficulty in making such a judgment is perhaps all too apparent.



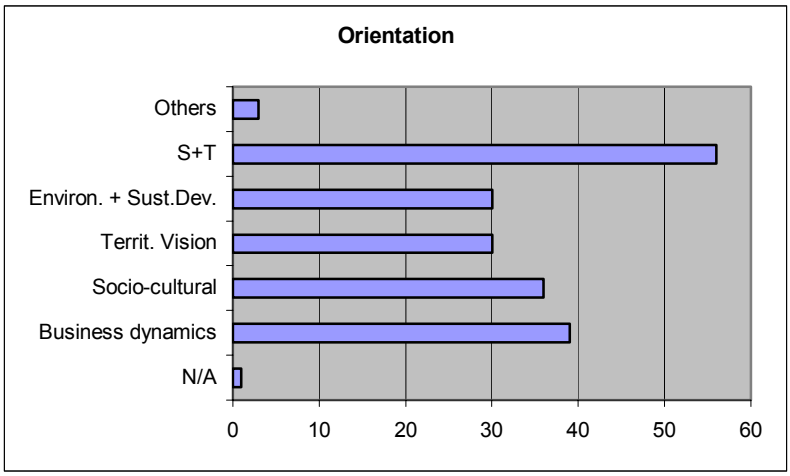
Formal techniques, such as Delphi and scenarios, were judged to be the founding basis of an exercise in around one-third of cases. For a similar number, formal techniques supported reflections within an exercise. In other words, formal techniques were used in around two-thirds of the exercises mapped. By contrast, no such techniques were used in 20% of cases. For a similar number, this information was unavailable.



The chart below shows that in more than 40% of exercises mapped, Foresight was judged to be a direct input to strategic planning. In a further quarter of cases, it was used as a basis for vision-building. In only 18% of cases was an exercise judged to be explorative. In other words, the exercises mapped are, on the whole, strongly associated with direct action.

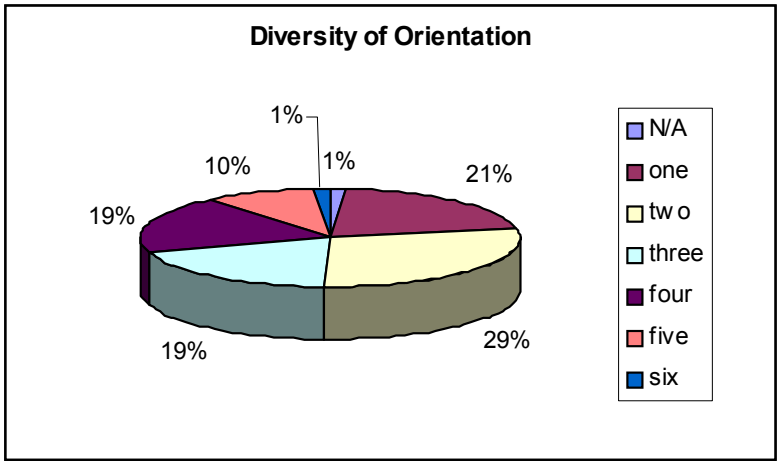


4.2.3 Table 2: Foresight Scope

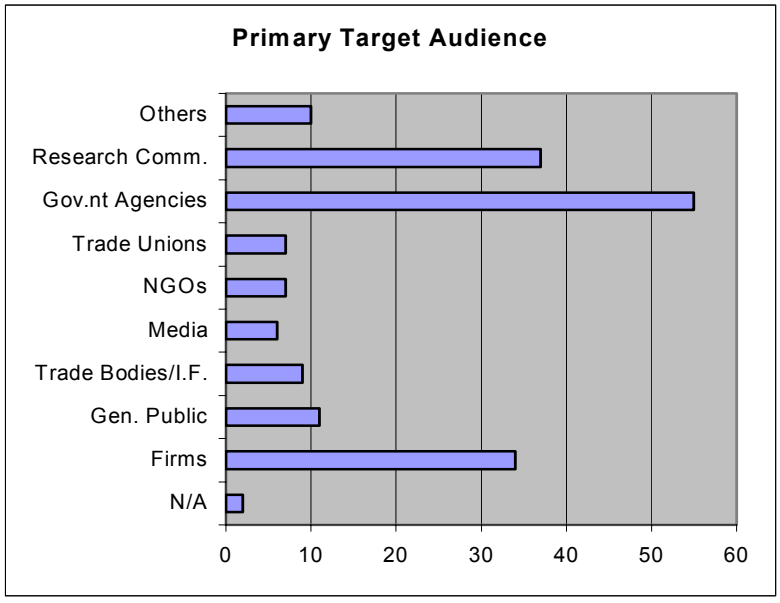


The most popular orientation of the exercises mapped was Science and Technology, reflecting our boundary preference for these types of activities. The next most popular orientation was business dynamics, followed closely by socio-cultural issues. Territorial vision and environment & sustainable development were both seen in 30 exercises each. Thus, we can conclude that a wide variety of orientations is in evidence.

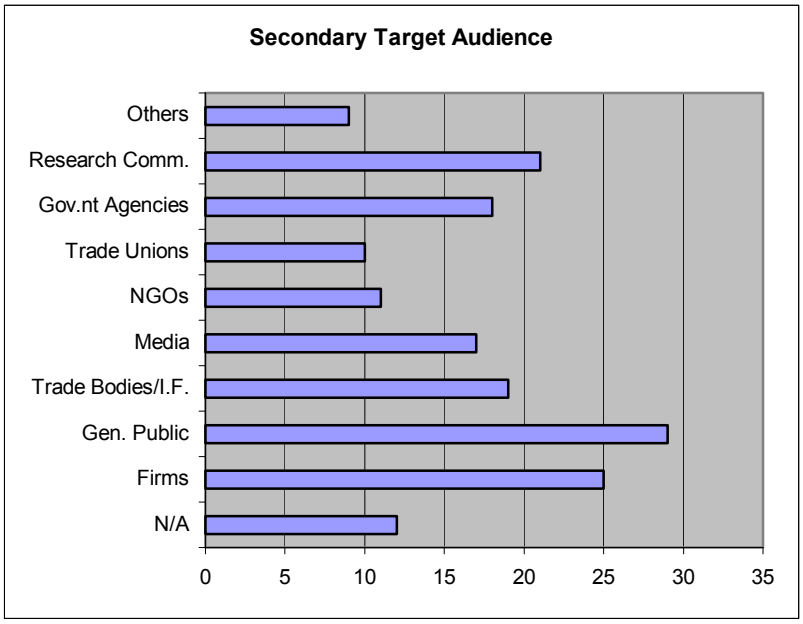
The project team was well aware that most exercises would have more than one orientation. This is borne out by analysing the pattern of orientation. As the chart below shows, only 21% of exercises mapped had a single orientation (usually Science & Technology), whilst the remaining 80% or so had two or more. Exercises with two orientations are the most numerous, although those with 3-5 orientations account for almost 50% of the total in the database.



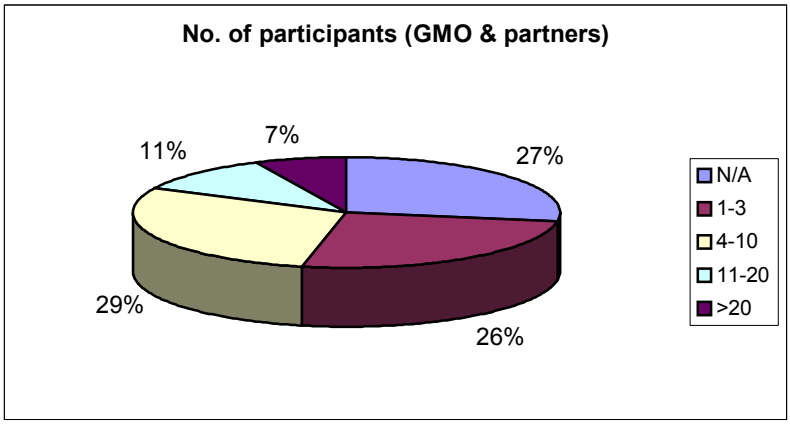
Government agencies are by far the most popular primary target audience for Foresight exercises, followed by the research community and firms. This is perhaps unsurprising given the orientation of the activities mapped by the project (see above). Moreover, government agencies are, for the most part, the chief sponsors of the Foresight exercises we have mapped. All other groups, including trades unions, the general public, and the media, are considered primary targets in only a handful of exercises mapped.



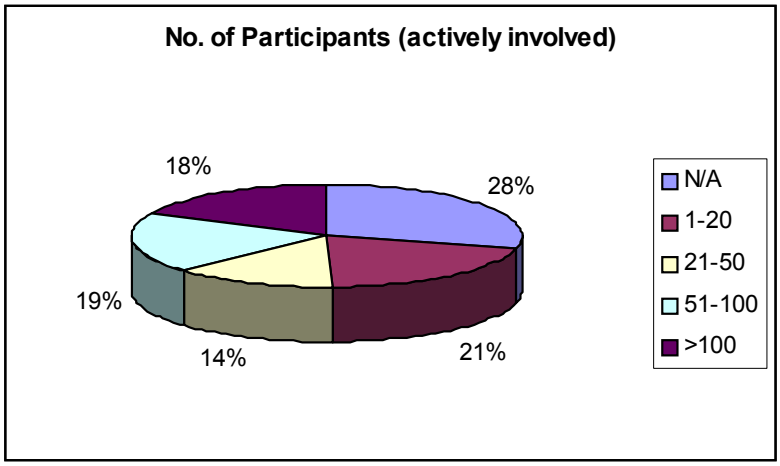
As the chart below shows, the picture is somewhat different with the secondary target audience. Even though the absolute numbers are small compared to those for the primary target audience, their distribution is more even. Significantly, the general public is the most popular secondary target audience, closely followed by firms. Also relatively important are trades bodies (incl. industrial federations) and the mass media, both of which are commonly considered as conduits for Foresight messages and thinking.



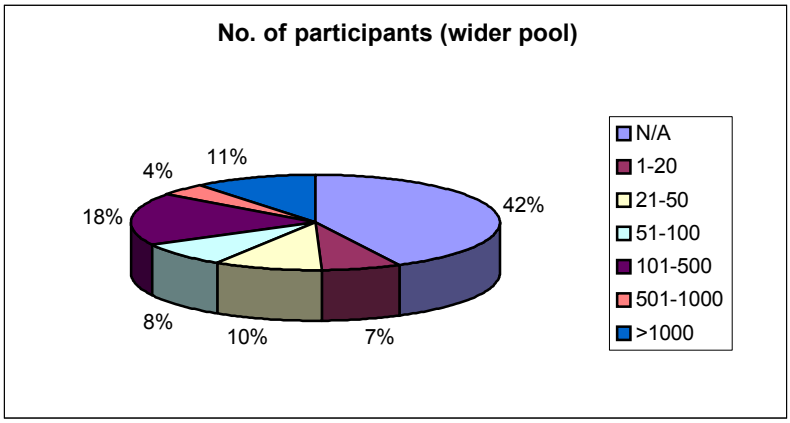
More than half the exercises mapped have less than 10 people working on its management team (including process consultants). A surprising 18% have more than 10 people working in this capacity, again an indicator of the resource demands of some of these exercises. In 27% of exercises, this data was not possible to collect – managers of exercises sometimes had difficulty in remembering how many people were involved in the running of their activities.



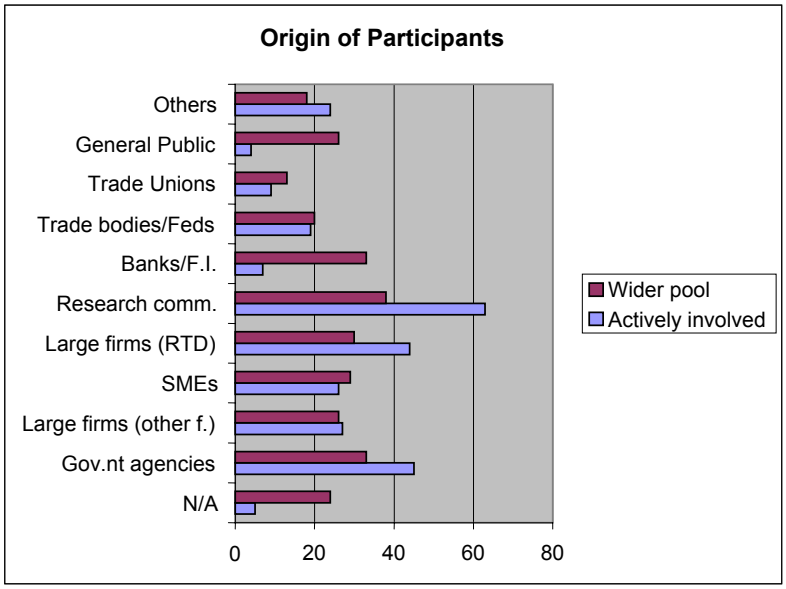
In 21% of exercises mapped, less than 20 people were actively involved on panels or working groups. However, most exercises had more people than this actively involved, with 18% having more than one hundred in such positions. As the chart below shows, we faced problems in collecting this data in 28% of exercises.



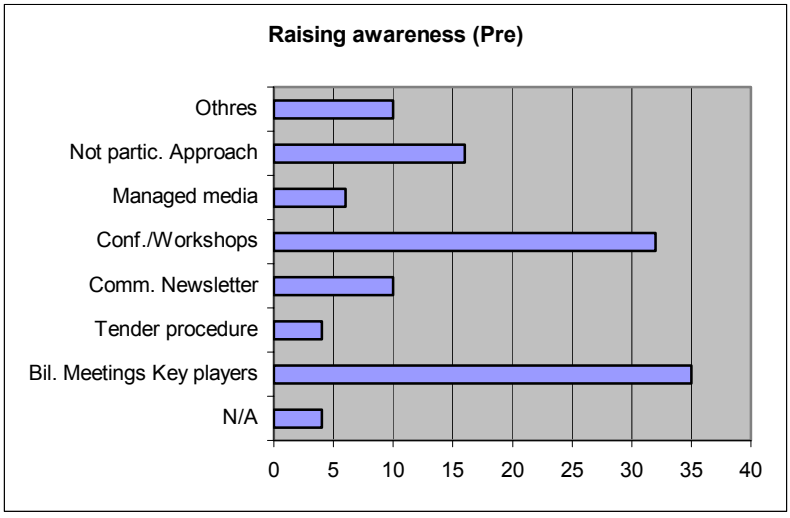
The first thing to note in the chart below is the absence of data in 42% of cases. This has two explanations: first, some exercises did not use a wider pool of participants; second, numbers on such participants are difficult to readily come by, given that this refers to questionnaire respondents, workshop attendees, etc. over the duration of an exercise. Where data was obtained, one-third of the mapped exercises engaged more than one hundred people, whilst 11% involved more than one thousand.



The results in the chart below closely mirror those concerning primary and secondary target audiences (see above). In other words, those most actively involved in Foresight (research community, govt agencies, and large firms) are also the most popular primary target audience. We have already seen that the general public are the most popular secondary target audience, and this chart shows that they're several times more likely to be engaged in a wider role than an active one (as are banks and other financial institutions). This is not an unexpected result, since the alleged process benefits associated with Foresight are most strongly felt by those actively involved.

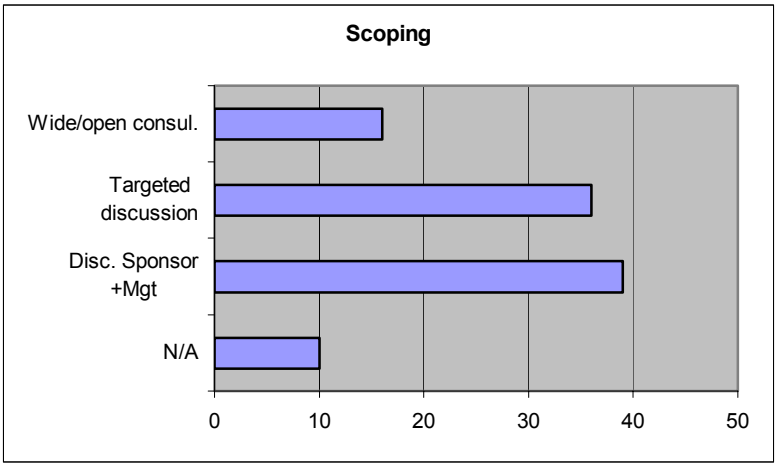


4.2.4 Table 4a: Tasks & Methods (Pre-Foresight)

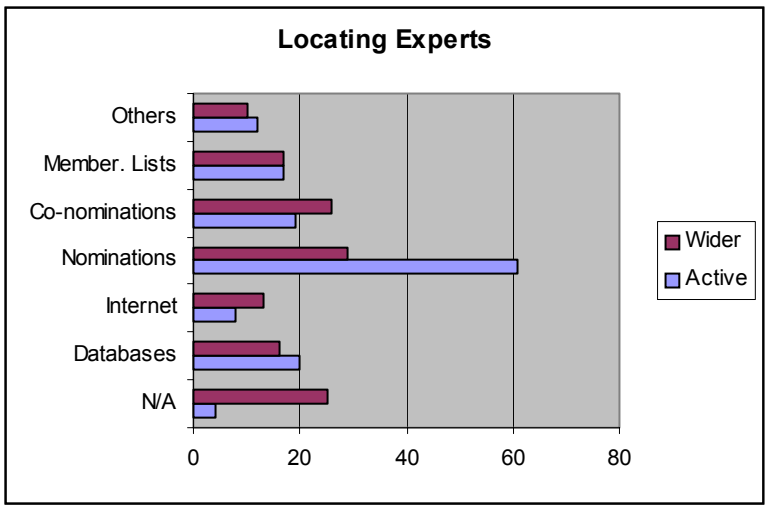


The idea of a Foresight exercise needs to be promoted if it is to obtain the necessary support to be realised. Of the approaches anticipated by the project team, bilateral meetings with key players proved to be the most popular approach, closely followed by conferences and workshops. Interestingly, no particular approach was taken in 16 of the mapped exercises. This may be scale dependent (i.e. smaller modest exercises may be

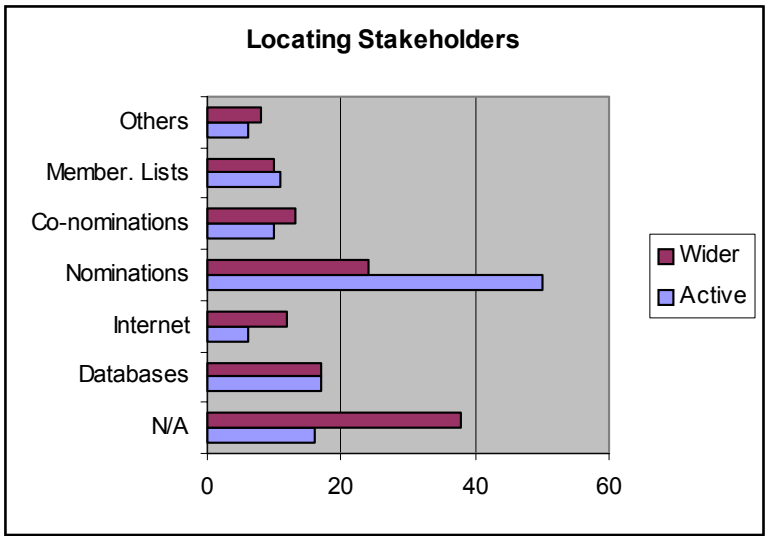
less likely to adopt any particular approach), but we would need to conduct some cross-tabulations in order to check whether this is the case.



The act of scoping a Foresight exercise can itself be an important enrolment mechanism that confers ownership on those involved. But it can also have its drawbacks, including cost and unwelcome ideas that must be addressed. It is therefore not surprising to find that only 16 exercises were judged to have a wide and open consultation on their scope, whilst targeted discussion with particular groups and internal discussions between sponsors and project managers were much more likely.

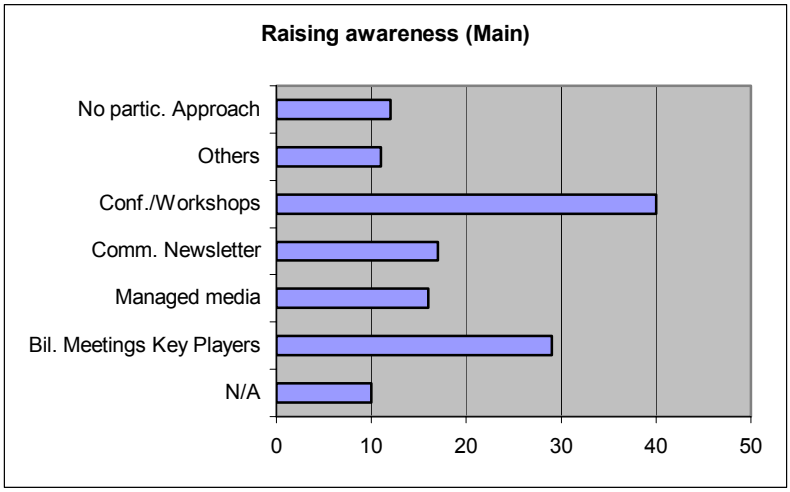


The chart above shows that by far the most popular approach for locating actively involved experts is to rely upon nominations from tried and trusted sources. All other approaches anticipated by the project team proved far less popular, although 20 exercises used databases of names whilst 19 used co-nomination. The picture is slightly different with regards to the wider pool. Here, nominations falls off considerably as a preferred method and is comparable to many other approaches in its popularity. The Internet is marginally more popular, as is co-nomination. Notably, no information was offered for 25 exercises, again illustrating the difficulties in obtaining information on those only loosely involved in Foresight.



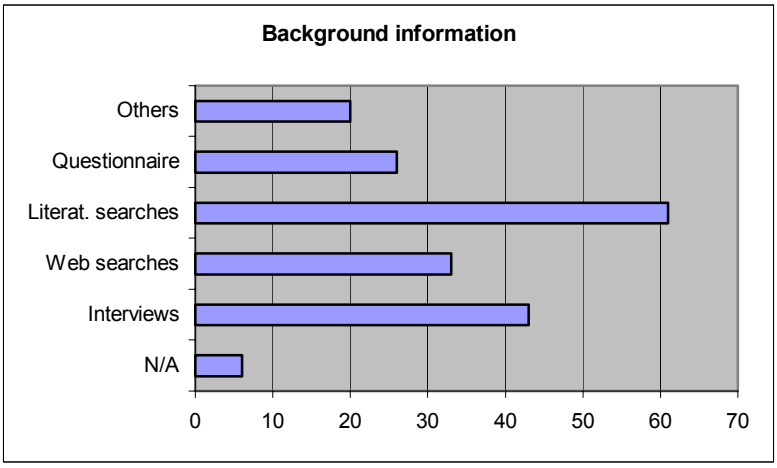
This chart shows a very similar pattern to the one above for experts, which suggested too many members of the project team that the distinction between experts and stakeholders was unnecessary. However, a couple of interesting divergences can be noted: first, co-nomination is half as popular for identifying stakeholders as it is for experts; and second, the use of membership lists is also less popular for identifying stakeholders. Yet, neither result is especially surprising, given that both these approaches are traditionally confined to locating experts/professionals rather than other groups. Finally, the relative lack of data on stakeholders (e.g. almost half the exercises have no data on locating stakeholders in a wider pool) is more profound than with experts. We have no explanation for this at the moment.

4.2.5 Table 4b: Tasks & Methods (Main Foresight)

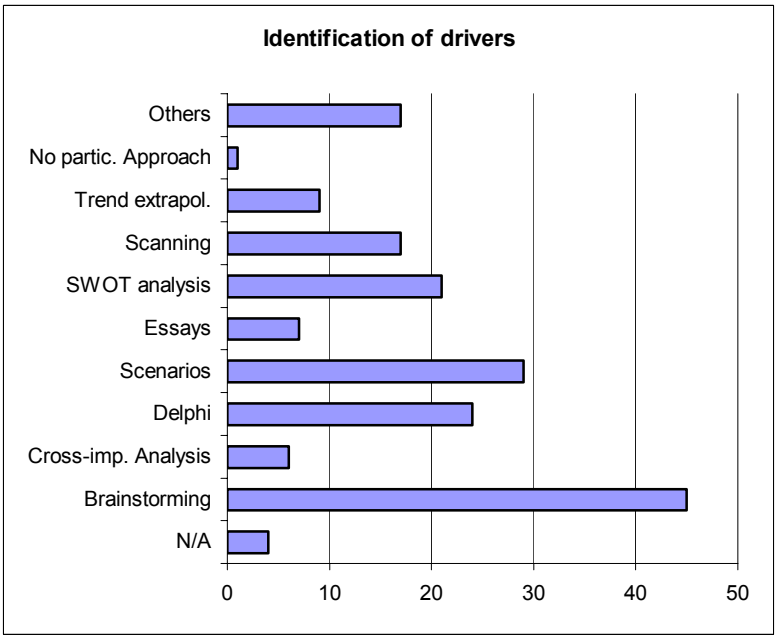


As with the pre-Foresight phase, the most common approaches for promoting an exercise during its main stages are conferences and workshops, and bilateral meetings with key players. But during this stage, a greater number of individuals is almost always enrolled in an exercise, necessitating greater use of tools (such as newsletters

and a managed media relations strategy) that are better capable of reaching out to a large number of people.

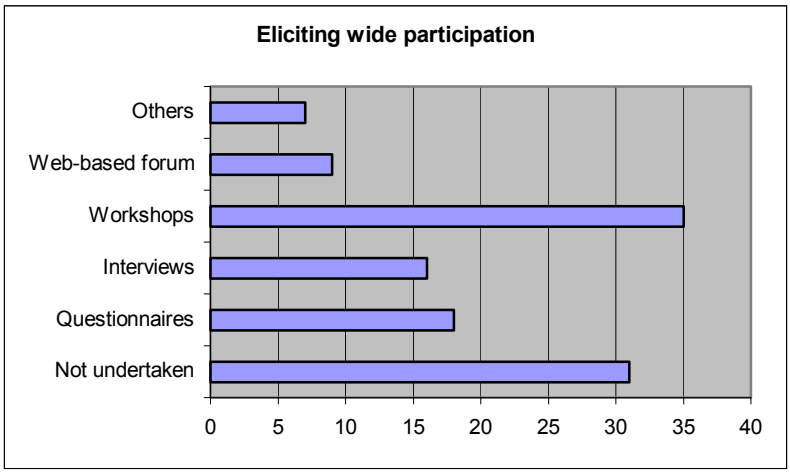


Turning to background information, literature searches have underpinned three-quarters of the exercises mapped, whilst more than half used interviews. Of particular interest here is the large number of 'Others', i.e. 20 mapped exercises used other approaches besides those anticipated by the project team. These 'Others' should be reviewed in order to improve our understanding of Foresight, and to improve the variety of values given to indicators in any up-scaled database.

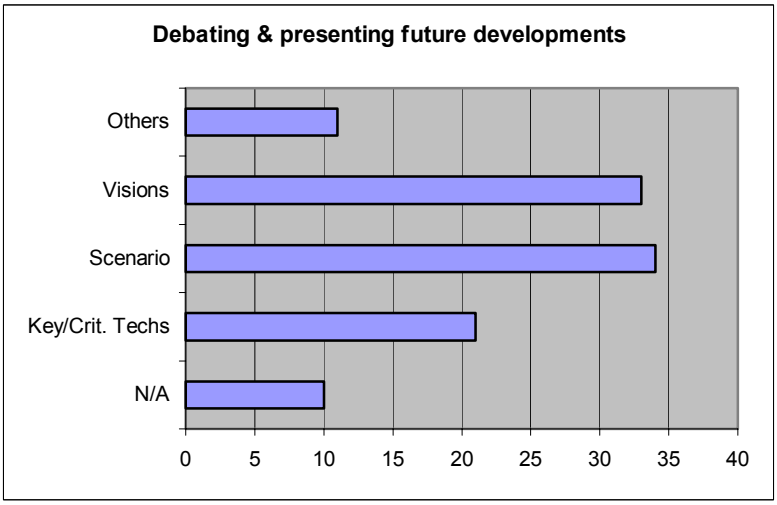


By far the most popular method for identifying drivers is brainstorming, perhaps reflecting the predominant group processes associated with Foresight. This is followed by the use of scenarios, again an approach commonly used with groups. Delphi, SWOT analyses, and scanning are the next most popular approaches – these tend to be more a mixture of group and deskwork. Trend extrapolation and essays, which tend to be the

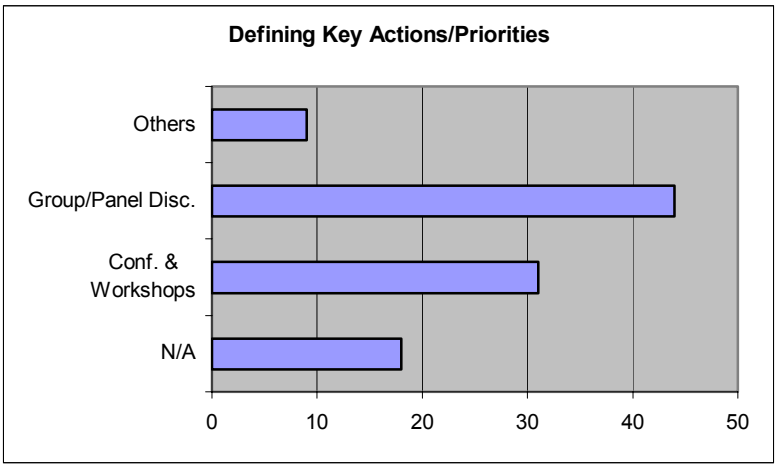
preserve of forecasting and futures specialists, were each used in less than 10 mapped exercises, whilst cross-impact analysis proved the least popular approach. Again, the large number of 'Others' is of interest for an up-scaled database.



Workshops are by far the most common approach for eliciting wide participation in Foresight, with almost half of the mapped exercises using this method. Questionnaires and workshops were the next most popular methods, followed by web-based forums, which were used in a relatively small number of exercises. The fact that wide engagement was not undertaken in more than 30 cases is of particular interest and helps to explain some of our results from earlier indicators, e.g. the absence of data on locating participants for the 'wider pool'.

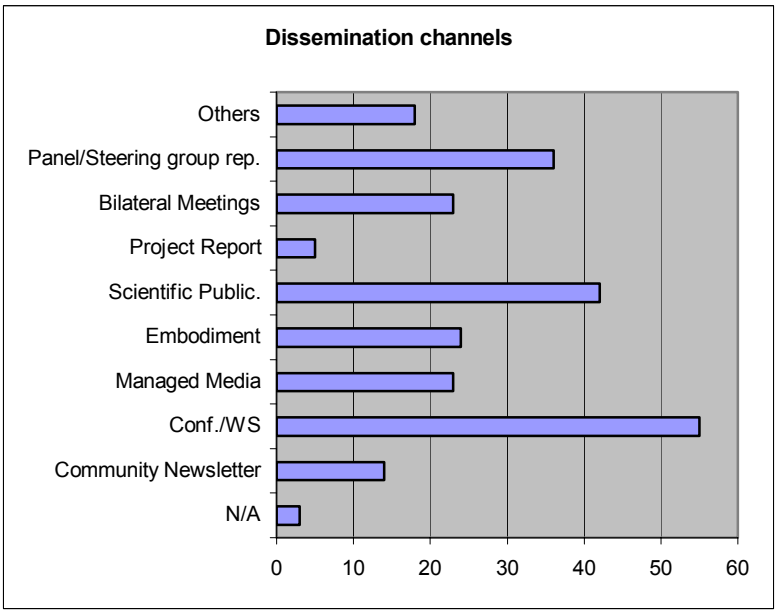


Scenarios and visions of the future appear to be popular methods for thinking about and presenting future developments, with almost half the exercises employing one of these methods. Key and critical technology approaches were used in a quarter of the mapped exercises, reflecting in part the predominance of an S&T orientation in our sample. The total frequencies in this chart are rather low compared to the others, suggesting that many mapped exercises used just a single approach for thinking about the future.

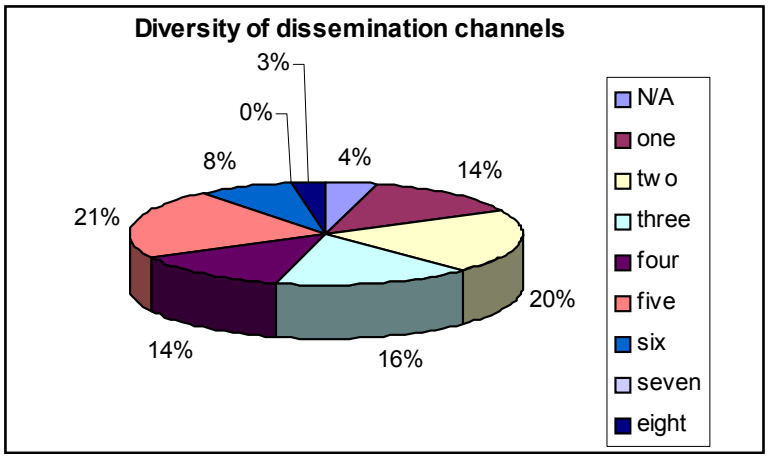


Key actions and priorities were most commonly defined within group and panel discussions. In around one-third of exercises, this process was extended to wider forums offered by conferences and workshops. We have no data for 18 of the mapped exercises, which suggests they did not attempt to identify actions/priorities. Again, the total frequencies in this chart are rather low compared to the others, suggesting that many mapped exercises used just a single approach for defining key actions and priorities.

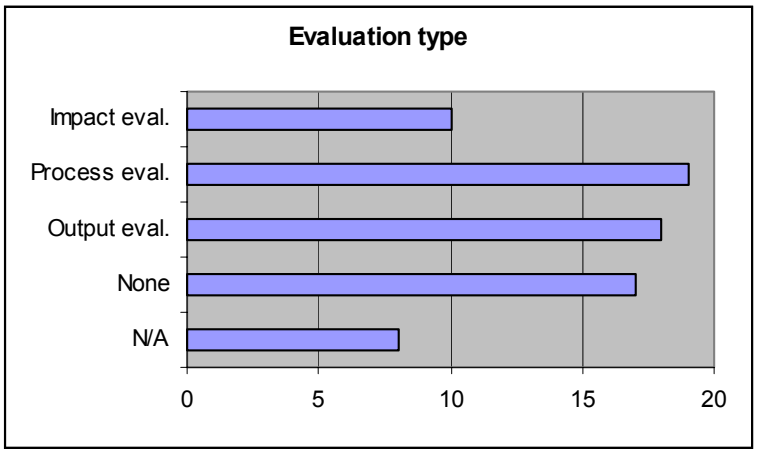
4.2.6 Table 4c: Tasks & Methods (Post-Foresight)



In terms of dissemination channels, conferences and workshops were reported in three-quarters of the mapped exercises, whilst around a half saw the production of panel/SG reports and scientific publications. Foresight's findings were also disseminated through embodiment in new projects and programmes, through bilateral meetings with key players, and through a managed mass media strategy. A newsletter was used in just under 20% of the mapped exercises, as were 'Other' approaches.

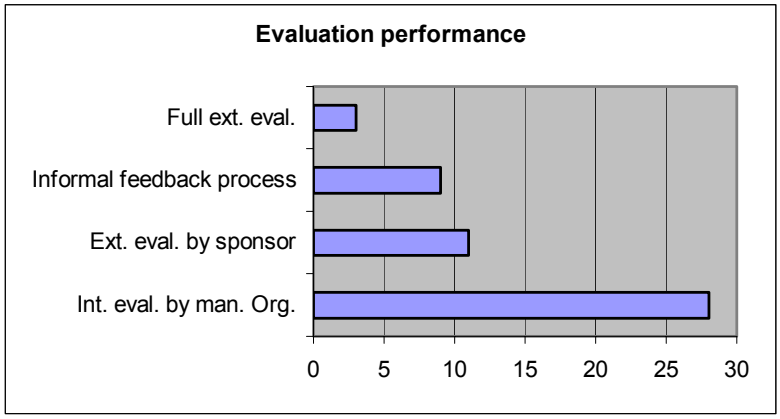


The chart above shows that only 14% of the mapped exercises relied upon a single dissemination channel. It was far more common for a variety of approaches to be used. Indeed, almost one-third of exercises used five or more dissemination channels as defined by the project team.

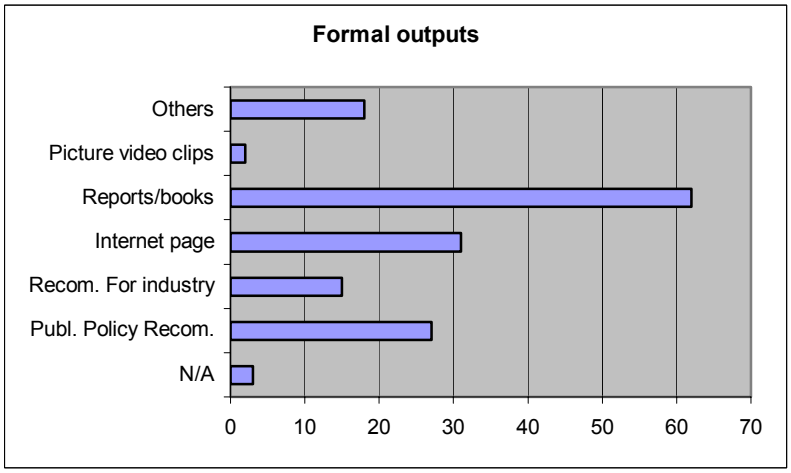


The figures in the above chart are higher than expected, which makes us suspect that evaluation has been taken to include review and monitoring work. But taking the figures at face value, process and impact evaluations are each said to have been conducted in around one-quarter of mapped exercises. Unsurprisingly, impact evaluation is far less popular given its difficulties.

The figures in the chart below perhaps tell a more accurate picture of the state of Foresight evaluation. By far the most popular approach is internal evaluation (probably no more than monitoring and review in the vast majority of cases), which has been carried out in around one-third of mapped exercises. External evaluation by the sponsoring organisation (again, probably more akin to review) and informal feedback from participants is seen in a relatively small number of exercises, whilst a full external evaluation was carried out in only three of the exercises mapped.



4.2.7 Table 5: Outputs and Outcomes



Of the formal outputs anticipated by the project team, reports and books were by far the most popular, with more than three-quarters of exercises generating these. Two-fifths of exercises had an active internet page with results and resources for others to use. Around one-third of exercises produced recommendations for public policy, somewhat less for industry. Again, the large number of 'Others' is of interest for an up-scaled database.

5. Conclusions and Recommendations

This pilot project represents a successful first step in the construction of a knowledge platform for Foresight in Europe. It has resulted in the construction of a database of mapped Foresight exercises, organisations and individuals, which, we hope, will form the basis for continuous monitoring of Foresight in Europe. In this section, we will discuss options for next steps.

5.1 General Issues

Constructing a database was a much more challenging task than the project team had originally anticipated. In other words, this is no small task. But its potential benefits are immense – a lot of data has been collected together in one accessible place for the first time, which provides both a useful reference resource and the opportunity to analyse a community and its activities. These are, in many respects, necessary prerequisites for successful policy intervention, i.e. the need to understand and give meaning to socio-technical phenomena. But others besides policy makers are also likely to find the database a useful asset, including other practitioners seeking to better understand practice elsewhere.

Before considering the specifics of reviewing, migrating, and up-scaling the database, a few general issues will be raised:

- A pilot study can represent a 'proof-of-concept' prototype to be latterly discarded or a platform from which to expand. We would recommend the second option be followed.
- The database has the potential for more than meeting 'first order' information demands. As we stated in the Introduction to this report, there are 'second order' information demands that can be met. In this sense, the database offers something of a framework for collective strategic reflection within the Foresight community. The database could also offer a vehicle for an emerging Foresight community to present itself to the outside world.
- There is the question of whether such a database should be funded using public money. The EC has its own specific information requirements that the database is supposed to meet. But the EC is also in the business of building infrastructures for others to use, and the database would seem to be a good example of this. The question is whether the private sector would be in a position to offer similar services at reasonable cost. For instance, we are aware of a loose consortium of futures organisations, known as "europrospective", that profess to have mapped some Foresight activities and competencies in Europe already. Unfortunately, we have not had the opportunity to obtain access to this resource at the time of writing (registration costs €250) and can therefore make no judgement on its scope or quality.
- Finally, we must be realistic in our expectations of what can be achieved through the Eurofore database. Like all databases, it has important limitations that we have tried to highlight throughout this report.

For the purpose of making recommendations we have assumed that EC resources will continue to be available to fund an up-scale and migration of this pilot project, i.e. a full Foresight monitoring service.

5.2 Stage 2: Review and Preparation for Full-Scale Mapping

This pilot study has successfully investigated a number of important issues for anyone thinking about mapping and continuously monitoring Foresight activities and competencies on a European scale. It has also raised a new host of questions, which we believe need to be addressed before the pilot project can be successfully up-scaled. We will now discuss these under similar headings as used earlier, i.e. boundary issues, mapping indicators, data collection strategies, search interface (including data analysis ands presentation), and database up-scaling and migration.

5.2.1 Boundary issues

The boundary issues explicitly considered in this project were set by the project team. Moreover, the project team decided where the boundaries should be drawn for the purposes of the pilot. It is our belief that these boundaries now need to be reviewed more fully by ESTO, the European Commission, and potential users, both in terms of their appropriateness and their delimitations. With this in mind, we would like to raise a few open questions for consideration.

The first concerns our preference for mapping only the **competencies** of those organisations and individuals linked to mapped exercises. Our original intention here was clear – we wanted only to record the competencies of genuine practitioners and to avoid charlatans with spurious claims to Foresight expertise. However, this approach has had two (largely anticipated) consequences: firstly, it has resulted in some organisations and individuals who should be mapped being excluded, since only a fraction of European Foresight exercises have been mapped. And secondly, it has resulted in a whole host of non-Foresight organisations and individuals being entered into the database as sponsors and promoters of Foresight exercises. We would make the following points:

- If the database is to be respected as a knowledge base, we will need to ensure that some of the 'obvious names' are quickly mapped, irrespective of their links to currently mapped exercises, otherwise the project's integrity and seriousness may be questioned. We make some suggestions for doing this below. At the same time, we would encourage the maintenance of our standards in the long-term, so that only 'true' practitioners are mapped into the database.
- Non-Foresight organisations and individuals, i.e. sponsors and promoters, should still be mapped into the database but using a different set of indicators. Our suggestions would be for the following to be recorded: (organisation / individual) name, contact details, exercise(s) they are linked to, their role (sponsor/promoter/other), and the objectives and rationale of the exercise(s) to which they are linked. This will be relatively straightforward to achieve, since all of this data is already entered into the database at various places.

A second issue concerns our preference for Foresight exercises with an explicit (though not necessarily exclusive) **Science and Technology orientation**. We would suggest that this preference is loosely maintained, since many activities from other fields, e.g. the built environment, are likely to be of minimal interest to the RTD community. On the other hand, we wonder whether Science & Technology Foresight has distinct features that make *transfer of practice* from other areas of orientation problematic. We tend not to think so, and consideration should be given to mapping all individuals and organisations in Europe with the requisite Foresight competencies, whether or not these have been applied in S&T Foresight. Obviously, this calls into question a competency mapping approach that focuses only upon those organisations and individuals linked to mapped exercises. If this approach was to be abandoned, then alternative 'quality control' arrangements should be developed to ensure that only 'true' practitioners are entered into the database.

A third issue concerns **coverage**. There are a number of different dimensions to this, including territory, domain, public/private, and autonomy of Foresight exercises. Dealing with territory first: we have mapped supranational (including EU), cross-border, national, regional, municipality, and city-level Foresight activities. We believe this diversity should be maintained. Consideration should be given as to whether coverage should be extended to other parts of the world, including the United States, Australia, Asia, and Latin America, where the project team is aware of ongoing Foresight activities.

Turning to domain area, again, we have set no explicit limits on this during the pilot stage. If the S&T orientation is to be maintained, then Foresight monitoring should cover any sector or problem-oriented activities that fall within this orientation. The public-private distinction is also relatively straightforward – if information on the conduct and outputs of an activity is in the public domain, then this should be considered for mapping, irrespective of whether it has been funded using public or private finance. But two further points need to be considered here:

- Most private sector Foresight is not in the public domain. Therefore, any private sector activities that are mapped are likely to account for only a small fraction of total activity and are probably unrepresentative.
- There is the issue of whether Foresight competencies located within firms should be mapped (this question does not apply to Foresight process consultants, which we would map in any case). Again, we suggest an open mind is maintained on this. If such organisations and individuals are publicly known to have Foresight competencies and are agreeable to being mapped, then their details should be included in the database.

A further issue falling under the coverage rubric concerns the size and autonomy of Foresight activities to be mapped. To elaborate, Foresight activities do not exist only as stand-alone exercises; many activities are *embedded* in other projects, initiatives and programmes. The pilot project has, for the most part, focused upon the stand-alone variety of Foresight. Indeed, the indicator set used has been designed with these sorts of activities in mind. But it is possible, and perhaps even likely, that the fastest growth in the use of Foresight techniques will be in embedded environments. This offers particular challenges for Foresight monitoring, on account of (a) difficulties in identifying these sorts of activities in the first place, and (b) designing an indicator set

that can accommodate their variety. We recommend that a short study into these sorts of activities be conducted before any full-scale attempt is made to map/monitor them.

Finally, there is the issue of mapping ongoing foresight exercises. We noticed that a number of interesting ongoing exercises could be relatively easily identified, but it was sometimes quite problematic to obtain more detailed data for these (documents were still in process, the people familiar with the foresight exercises were too busy at the moment, etc.; this happened for instance with some Swedish and Danish cases). This point highlights well the need for continuous monitoring.

The final boundary issue concerns the position of **other Strategic Policy Intelligence (SPI) activities and competencies**. SPI is an umbrella term that has come to refer to Foresight, Technology Assessment (TA), Technological Forecasting, and (in some accounts) Evaluation. Although the boundaries between these activities are often rather blurred, we believe that extending monitoring to include all of them would be unwise. For one thing, the population of relevant activities for mapping would suddenly multiply at least ten-fold and probably by more. And there are sufficient differences between these activities that would make the use of a common indicator set highly problematic. On the other hand, if the Commission wanted to map these sorts of activities, there may be benefits in collecting them together in one place under the SPI heading. For instance, we know that a pilot mapping activity at the European level in the area of TA has already been conducted.[10] This could be followed up and put alongside the Foresight monitoring tool. Indeed, since individuals and organisations tend to be the common elements between many of the various SPI tools, it is possible to envisage a common indicator set for these, with the different sorts of activities then 'hanging off' these records. Again, this is an idea for further consideration.

There are a couple of caveats we would like to raise with regards to our position on the boundary integrity of Foresight vis-à-vis other SPI techniques:

- Some of the competencies useful to Foresight are commonly found amongst practitioners using these other SPI techniques. For example, Technological Forecasters tend to be very familiar with tools such as Delphi, trend extrapolation, and modelling, whilst TA practitioners commonly use scenarios and participatory methods, e.g. lay panels. Thus, whilst Foresight monitoring should exclude TA and Technological Forecasting activities, consideration should be given to including (at least) some of the individuals and organisations practicing in these fields. How this might be done will need to be considered further.
- Trying to maintain the boundary integrity of socio-technical practices such as Foresight has its challenges. The field is in a constant state of evolution, borrowing from other areas and developing its own knowledge platform. Care must be taken not to stifle this innovation through adherence to some idealised view of what Foresight is or should be. In this sense, Foresight mapping / monitoring should not set out to be exclusionary (although to some extent this will be inevitable). On the other hand, if the database is to be taken seriously, then some standards must be maintained. An 'anything goes' philosophy will ultimately undermine the database and the practice of Foresight itself. Clearly,

[10] Rader M (2001) "Monitoring of Technology Assessment Activities", ESTO report, JRC-IPTS

there is a balance to be struck here, requiring the emerging Foresight community to be reflexive and open to new developments whilst maintaining some minimum standards.

5.2.2 Mapping Indicators

Section 3 has already raised a number of specific issues associated with some of the indicators used in the pilot study, and it is not our intention to repeat these here. Rather, we would like to raise some generic issues concerning the indicators and to suggest possible ways forward:

- There is some doubt as to whether we want to maintain the same level of detail, e.g. between those "actively involved" and the "wider pool" within the activities database. Even where differences are found, it is questionable whether these are so informative as to warrant their continuing distinction in the database. In other words, we need to consider whether the activities database is unnecessarily complicated.
- Some of the most interesting and important fields (especially in Tables 3 and 5) are open-ended text fields, which are difficult to analyse. It would have been preferable if some structure could have been imposed on these fields from the outset, but this was not possible for reasons outlined earlier. Now that data has been gathered in these fields, however, it would be worth reviewing their contents in order to investigate whether some structure (new indicators and options) could be brought to bear. At the same time, the implausibility of being able to structure all fields in the database must be acknowledged.
- In relation to the previous point, the 'Others' fields in the database, with their corresponding elaboration in comment boxes, should be analysed in order to improve indicators and (especially) their lists of options.
- The project team would like to see more on impacts of Foresight in the database, but within the constraints of existing knowledge, this was difficult to achieve. Examination of the open text fields might provide some useful clues here, although ultimately, research needs to be conducted in this area. A further suggestion was for an extra field to be included in the database that asks about lessons learnt and how things would be done differently (better) next time around (this could have both policy and methodological aspects). This extra field has now been added to the database, but few project partners have had the opportunity to complete it.
- Ideally, further testing on the Organisation and Individual fiche indicators is required (see below). On the other hand, these seem to be relatively straightforward and the project team anticipates few problems.

It is our contention that the project team should not address these issues alone. We believe that users of the database now need to become involved in reviewing all aspects of the pilot project. This applies in particular to the European Commission. But there is also a need for wider usability trials of the database, possibly involving small groups of people in different countries. A standardised approach should be followed in these trials, informed in part by approaches already used in the world of ICTs.

5.2.3 Data collection strategies

Much data has already been collected in the course of the pilot study. This experience has led us to conclude the following:

- The template for mapping activities is too complicated to send out 'cold', even with accompanying guidance notes. Therefore, if the current template is to be more or less retained, interviews will continue to be required for data collection. But a lot of time is needed to map exercises in this way (around one day per exercise). If this is deemed unsatisfactory, then a couple of options could be considered:
    - The indicators framework could be simplified with fewer and more straightforward fields; and/or
    - Ambitions to record all Foresight activities in Europe could be reduced, with some targeting of the most important or interesting exercises (although determining what are the most 'important' and 'interesting' has its own challenges – but one approach might be to limit territorial scale).
- By contrast, the templates for mapping organisations and individuals are relatively straightforward to complete and can be e-mailed / posted 'cold', with accompanying guidance notes. Alternatively, web-based forms could be used that transfer data directly into the database (this option will be discussed more fully in Section 5.3).
- Serious consideration must be given to possible strategies for identifying relevant organisations, individuals and activities/exercises.

In this intermediate stage between the pilot and full-scale mapping / monitoring, further data gathering could be embarked upon. This should, however, be modest in scale and scope. We suggest a dual approach could be followed:

1. As already pointed out in earlier parts of this report, many of the Organisational and Individual Fiches in the database remain empty. There was neither the time nor the budget to collect this data as comprehensively as we had done for mapping Foresight activities. We suggest that one or two groups should now be contracted to collect this data. Where possible, this should be done online, with organisations and individuals contacted for information (contact details are, for the most part, already contained within the database). We estimate that this task will take little more than one month to complete and would require perhaps 12-15 person days of effort. It would have the benefit of substantially enhancing the database at little cost, and would also provide further insight into the indicator frameworks for organisations and individuals.
2. In preparation for the full-scale mapping / monitoring, we should try to get some indication of the size of the Foresight 'universe', in terms of the number of exercises conducted and the competencies that exist. Notwithstanding some of the boundary issues discussed in Section 5.2.1, some sort of review of activities and competencies should be conducted, probably through a survey of those practitioners already entered into the database. What is clear is that we have only a fraction of activities conducted in some of the larger countries (particularly the UK, France and Germany), whilst in others, e.g. Austria, we believe we may have almost the complete picture. Co-nomination approaches,

which have themselves been extensively used in Foresight, could now be used for identifying further activities, individuals and organisations.

5.2.4 Search interface (including presentation and data analysis)

As already indicated, the search interface developed so far is deliberately basic. Until migration and up-scaling decisions have been taken, there has been little point in developing sophisticated search routines. Nevertheless, as an intermediate, some improvements could probably still be made to the search interface. These improvements, and, more importantly, the long term plans for data presentation, should be informed by the Commission and other users of the database. We therefore suggest that any usability trials conducted should also encompass consideration of data presentation and search routines.

As for data analysis, we suggest that Section 4.2 should be expanded and placed on to the web site as an intermediary step towards the availability of a full data analysis facility. We will discuss this in more detail in Section 5.3, but the basic idea is that database users should be able to conduct their own data analysis via the web interface. As this requires dedicated software, we recommend that this should not be attempted until the database has been up-scaled and migrated.

5.2.5 Up-scaling and migrating the database: technological options

Technologically speaking, various options are available for up-scaling and migrating the database:

- On a Unix / Linux platform, the MySQL database tool is an obvious choice. Postgres or Oracle could also be considered. Suitable web architectures in this instance might include Perl, PHP and Coldfusion.
- On a Windows platform, one could opt for a simple desktop database tool such as Borland Paradox or Microsoft Access, or opt for something more scalable and robust such as SQL Server, Personal Oracle.

It is also possible to mix and match technologies, depending on organisational standards and the mix of skills in the project. However, we make no recommendations on the operating platform, database software, or web architecture that should be used in an up-scaled and migrated database. This decision will reside solely with the host organisation.

Platform	Database	Web interface or architecture
Linux / Unix	MySQL Oracle Postgres	PHP Perl Coldfusion Python Java servlets / Java
Windows	Access Paradox *SQL Server* *Oracle* MySQL	ASP Perl PHP Coldfusion Python Java servlets / Java

5.3 Stage 3: Full-Scale Mapping / Monitoring

This pilot project has, we believe, provided a sound basis for the initiation of a full-scale Foresight monitoring activity. This groundwork will be further strengthened by the activities we have recommended as 'Stage 2' of the project. In this section, we consider possible arrangements for a full-scale monitoring of Foresight activities and competencies, i.e. for 'Stage 3'.

5.3.1 Monitoring infrastructure

It is clear from the pilot project that local knowledge is all-important in identifying activities and competencies, particularly those at the sub-national level. This would seem to suggest the need for 'national correspondents' to keep a watchful eye on national developments. These correspondents (or gatekeepers) would need to have standing and credibility in the Foresight field to be effective. They would be given working guidance, whilst quality control mechanisms would need to be put in place.

An alternative or perhaps complementary approach to national correspondents could use co-nomination, where the knowledge of those individuals entered into the database would be drawn upon periodically in order to keep things updated. In other words, individuals in the database would be invited to 'nominate' new activities, individuals and organisations. Using this information, data collection could, at least in theory, be carried out by perhaps only one or two organisations. Whilst this approach would seem to be less cumbersome to manage and certainly less expensive than using national correspondents, it is highly questionable whether the co-nomination approach would alone result in the systematic identification of new activities and competencies. This is a matter to consider with future sponsors of the monitoring activity.

Where possible, an infrastructure should be put in place that allows people to update and complete records for themselves. We believe this will be impossible to do using the current version of the activities indicator framework, but that the organisational and individual fiches are suitable for remote online self-completion. But for individuals and organisations to feel sufficiently inclined to enter their details, the database will have to aim to achieve sufficient prestige as to 'require' individuals and organisations to be part of it. Under such circumstances, it might be expected that such people would be willing to upload and maintain their own information out of self-interest. In this way, some database maintenance could, at least in theory, be largely devolved to the Foresight community. There are, however, a few realities that need to be taken into account here:

- As yet, a Foresight community with its own distinct identity is still rather embryonic (whether such a community should be nurtured is a moot point – the assumption underpinning this pilot study is that such a community should be built). The current emergent status of such a community is both an opportunity and a barrier for the database: it is an opportunity in that nothing similar has been attempted before in the Foresight field (although there are a few examples from the futures and forecasting fields) and the novelty value could therefore be widely welcomed; but it could also be a barrier if people fail to recognise themselves or their organisations as being part of an emerging Foresight community.

- Although it might be in the self-interest of individuals and organisations to detail themselves and their Foresight activities in the database, we anticipate that they will need prompting to do so. Thus, if the database is to be actively renewed, it is likely that some sort of 'central command' will be required to remind people that they should enter their details. Whether most of this 'central command' should be devolved to 'correspondents' in nation states will need to be considered.
- Quality control is an important issue here. Records could be put into a 'holding area' (in suspense) in the database for verification by national correspondents or some central command structure.
- Given a need for rather subjective interpretations of many of the indicators, the impact of the heightened level of common understanding achieved between the current partners should not be underestimated. If only a self-completion strategy was followed, this understanding would be near-impossible to achieve, even with comprehensive written guidelines.
- It is a fact of life that individuals and organisations must, to a great extent, shape their activities according to funding opportunities. If Foresight fails to be supported with real resources in the future, then interest will wane and few people will be interested in supporting the database or being part of an emerging Foresight community. In other words, there must be incentives for individuals and organisations to participate in updating their details.
- The suspicion amongst the project team is that the database alone is unlikely to attract sufficient interest of users (both inside and outside of the emerging Foresight community) to warrant the costs and effort associated with its maintenance. This leads us to conclude that the database must be part of a larger knowledge platform where users can gain access to other Foresight-related resources, such as the results of Foresight activities (e.g. in the form of reports and meta-analyses of emerging issues), the provision of training materials and online guides, and the availability of discussion fora.

Thus, by conclusion, we believe that a mixed approach would be preferable, with national correspondents established coupled with the use of co-nomination and self-completion wherever this is likely to be fruitful.

5.3.2 Marketing the database

Clearly, individuals and organisations must have some awareness of the database if they are to use it. The act of getting individuals and organisations to enter their own details into the database is an important way to raise awareness of its existence. But other ways could be used for raising awareness – for example, the database could have links from various sites, including those of the organisations entered. It could also feature on CORDIS, UNIDO, DG RTD site, IPTS, various national-level institutions etc. Academic and policy publications could also feature the database, whilst conferences offer a further excellent dissemination route.

However, an important drawback is the fact that the database is only in English. This can be highly problematic in some instances – for example, at the regional and industrial sector levels, English is not always widely understood. There is therefore a

case for providing non-English summaries, with, for instance, German exercises also having a German language summary.

5.3.3 Data analysis

The pilot project has only hinted at the potential for analysing the database. With more data and an improved interface, all sorts of research is possible (both quantitative and qualitative). Moreover, it is probable that further research questions will emerge through such analysis (i.e. the database could contribute to the Foresight research agenda). The database may also be used for generating network depictions. This is possible, given that deliberate attempts have been made to link exercises, organisations and individuals together in the database.

We believe there may be merit in periodically producing an analytical report of the whole database, perhaps on an annual basis. In addition to this, thematic reports could be generated that address particular issues that may/may not be addressed in the database. Targeted surveys could be distributed and the results written up and made available on the database web site. In this scenario, the database web site would become a knowledge platform for Foresight, with the database at its centre.

5.4 Summary of Recommendations

We conclude with a checklist of actions that we believe need to be undertaken before full mapping can get underway. All of these points have already been covered in the preceding text – we reiterate them here for ease of reference. They include:

- The Organisational and Individual fiches that remain empty (except those for sponsors and promoters) should be filled as soon as possible.
- The European Foresight universe should be initially mapped using co-nomination techniques.
- Usability trials need to be conducted that will inform revisions of the database and the search interface.
- Indicators and their options need to be reviewed in light of the pilot study and usability trials, and revised frameworks constructed. This is especially pressing for the Activities database.
- The database must be migrated to a better and scaleable platform, given the limitations of MS Access.
- Further analysis of the database should be conducted once we are reasonably satisfied with the quality and quantity of data.
- An improved search interface should be developed on the new operating platform.
- Operational arrangements for a full Foresight Monitoring Service should be finalised.
- In the meantime, a marketing strategy should be formulated.

These steps should be carried out as soon as possible before full mapping can be implemented. It is our belief that they need not be too resource intensive, but that the value-added to the data collected already would be immense.

Annexe 1: Foresight Activities in the Database (Oct 2002)

Country	Exercise name (in English)	Exercise name
Austria	Urban development strategy Erdberger Mais, Vienna	Stadtteilentwicklungskonzept Erdberger Mais, Wien
Austria	Scenarios and Strategies for Vocational Education and Training in Europe	Scenarios and Strategies for Vocational Education and Training in Europe
Austria	The Future of Mobility in Austria. Consequences for Technology Policy	Zukunft der Mobilität in Österreich. Konsequenzen für die Technologiepolitik
Austria	Technology Delphi Austria	Technologie Delphi Austria
Austria	Innovation and development potential biomedical technologies. BMT Austria 2000	Innovations- und Entwicklungspotential Biomedizinische Technik. BMT Austria 2000
Austria	Visions of a wireless information society	Die Zukunft der mobilen Kommunikation
Belgium	Breakthrough to the Future with the Information Society in the Liège Region	FASIL (Forcer lAvenir par la Société de lInformation en région de Liège)
Belgium	PROMETHEE Wallonia	PROMETHEE Wallonie
Belgium	Belgian Federal Foresight Study	Foresight studie ter ondersteuning van het federale wetenschapsbeleid
Belgium	Sustainability and nuclear development	Kernenergie en duurzame energievoorziening
Belgium	SPIN OFF Strategic Plan Innovation: New Opportunities for the Future	SPIN OFF Limburg
Czech Republic	Visions for the Development of the Czech Republic to 2015	Vize rozvoje Ceske republiky do roku 2015
Czech Republic	National Program of Oriented Research	Narodni program orientovaneho vyzkumu
Denmark	Energy Technology Foresight/Danish Engineers Association	Energy Technology Foresight/Danish Engineers Association
Denmark	Sensor Technology Foresight	Sensor Technology Foresight/Risoe
Denmark	Future Wind Turbines/Risoe	Future Wind Turbines/Risoe
Denmark	STRING	STRING/Risoe
Denmark	DECENT	DECENT/Risoe
Denmark	Bio/health technology foresight/Danish Ministry of STI	Bio/health technology foresight/Danish Ministry of STI
Denmark	Green Technology Foresight/Danish Ministry of STI	Green Technology Foresight/Danish Ministry of STI
Denmark	Pervasive Computing Foresight/Danish Ministry of STI	Pervasive Computing Foresight/Danish Ministry of STI
Estonia	Scenarios of Estonia until 2010	Eesti 2010

Country	Exercise name (in English)	Exercise name
Estonia	Estonian technology foresight	Eesti tehnoloogiaseire
Estonia	Estonian eVikings	Eesti eViikingid
EU	IPTS Enlargement Futures Project	IPTS Enlargement Futures Project
EU	The IPTS Futures Project	The IPTS Futures Project
Finland	The Future of the Food Industry (ETU 2030)	ETU 2030 - Elintarviketalouden reunaehdot vuoteen 2030
Finland	The Future prospects of knowledge-intensive business services	Osaamisintensiivisten liike-elämän palvelujen tulevaisuudennäkymät
Finland	Knowledge Society Strategy 2002-2005 for Southwest-Finland	Varsinais-Suomen tietoyhteiskuntastrategia 2002-2005
Finland	aaf	afa
Finland	NAVIfuture - Survey on future of personal navigation	NAVIfuture - Henkilökohtaisen navigoinnin tulevaisuusselvitys
Finland	Food Technology Foresight in Finland	Elintarviketeknologian ennakointi
Finland	Foresighting labour market in the Northern Ostrobothnia (Oulu Region)	Pohjois-Pohjanmaan työmarkkinoiden ennakointi
Finland	Energy Vision 2030 for Finland	Energiavisio 2030
Finland	Independent Living of Elderly People: Futures Policy and Gerontechnology	Ikääntyneiden itsenäinen selviytyminen: Tulevaisuuspolitiikka ja geronteknologia
Finland	Energy 2010 - Delphi panel TA of future energy choices	Energia 2010 - delfoi-paneelitutkimus/teknologian arviointi
France	Energy 2010-2020 : the challenges of the long term	Energie 2010-2020 : les défis du long terme
France	Research and environment - priority and emerging themes - international survey of scientists	Recherche et environnement – thèmes prioritaires et thèmes émergents – enquête internationale auprès de la communauté scientifique
France	Living in Île-de-France in 2025	Vivre en Île-de-France en 2025
France	Region Centre : which scenarios towards 2020 ?	Région Centre : Quels scénarios à lhorizon 2020 ?
France	Agriculture and Territories. Four scenarios for 2015	Agriculture et territoires. Quatre scénarios pour 2015
France	An exercise in scenario-building for pensions in France up to 2040	Un essai de prospective sur les retraites en France à lhorizon 2040
France	Limousin 2017	Limousin 2017
Germany	Four Motors Initiative Baden-Württemberg	Four Motors Initiative Baden-Württemberg
Germany	Secretariat for Futures Studies	Sekretariat für Zukunftsforschung

Country	Exercise name (in English)	Exercise name
Germany	Future Commission Society 2000	Zukunftskommission Gesellschaft 2000 der Landesregierung Baden-Württemberg
Germany	ZIRP - Future Initiative Rheinland-Pfalz	ZIRP - Zukunftsinitiative Rheinland-Pfalz
Germany	Delphi 98 survey, study on the global development of science and technology	Delphi 98-Umfrage, Studie zur globalen Entwicklung von Wissenschaft und Technik
Germany	Forecasting of the development on the market for agricultural machines	Prognose der Entwicklung des Agrartechnikmarktes
Germany	Future Impacts of Biotechnology on Agriculture, Food Production and Food Processing	Auswirkungen der Biotechnologie auf Landwirtschaft und Lebensmittelindustrie - eine Delphi-Studie - Results from Germany
Germany	Futur	Futur - der deutsche Forschungsdialog
Germany	Benchmarking Information and Communication Applications for the purpose of Marketing and Sales in the Tourism Sector - by example of the German federa	Benchmarking des iuk-gestützten Marketings und Vertriebs touristischer Leistungen - am Beispiel der deutschen Bundesländer und vergleichbarer europäis
Germany	The Future of the German Health System - view of physicists and experts	Die Zukunft des deutschen Gesundheitswesens aus der Sicht von Ärzten und Experten
Hungary	Hungarian Technology Foresight Programme	TEP, Technológiai Elõretekintési Program
Ireland	Irish Technology Foresight Programme	Irish Technology Foresight Programme
Ireland	Dublin City Futures	Dublin City Futures
Italy	National priorities for industrial research	Le priorità nazionali della ricerca industriale
Italy	FoMoFo : Four Motor Foresight	FoMoFo : Four Motor Foresight
Italy	National priorities for industrial R and S (2nd Report)	Priorità nazionali della ricerca industriale (2 o Rapporto)
Italy	Scenario Analysis 2001	Scenari per il Piemonte del 2000
Luxembourg	Workshop Esch 2006 Urban Vision	Workshop Esch 2006 Urban Vision
Netherlands	Nanotechnology, towards a molecular construction kit	Nanotechnologie, op weg naar een moleculaire bouwdoos
Netherlands	Brabant 2050	Brabant 2050
Netherlands	Rural Areas put on the map, knowledge and innovation priorities, apsirations for the 21st century	De groene ruimte op de kaart, kennis en innovatieagenda ambities voor de 21e eeuw
Netherlands	Technology Radar	Technologie Radar
Netherlands	Limburg 2030, excellent in Europe	Limburg 2030
Netherlands	Groningen - Assen 2030	Groningen - Assen 2030

Country	Exercise name (in English)	Exercise name
Netherlands	Longing for the endless sea	Verlangen naar de eindeloze zee
Netherlands	Flows and floods - knowledge and innovation challenges for a watery Netherlands	Over stromen - Kennis- en innovatieopgaven voor een waterrijk Nederland
Portugal	Engineering and Technology 2000 – Technology Foresight for Portugal 2000-2020	Engenharia e Tecnologia 2000 - Ensaio de prospectiva 2000-2020
Slovenia	Technological development in Slovenia	Tehnoloski razvoj v Sloveniji
Slovenia	Vision and development strategy of chemical & process industries in Slovenia	Vizija in strategija razvoja kemijske industrije v Sloveniji (ViSKI)
Slovenia	Present state and development possibilities of Biotechnology in Slovenia	Stanje in Razvojne moznosti biotehnologije v slovenskem prostoru
Spain	Future scenarios for the Information Society in the Catalan Region	Escenaris de Futur per a la Societat de la Informacio a Catalunya
Spain	Catalonia at 2010 horizon. Mediterranean Perspective.	Catalunya al horitzó 2010. Prospectiva mediterrània
Spain	Programme of Industrial Technological Foresight	Programa de Prospectiva Tecnologica Industrial
Sweden	Energy Foresight Sweden in Europe	Energiframsyn Sverige i Europa
Sweden	Regional Foresight in Western Sweden	Det Framsynta Västsverige
Turkey	Tukish National Information Infrastructure Master Plan (TUENA)	Türkiye Ulusal Enformasyon Altyapýsý Anaplaný (TUENA)
Turkey	National Technology Foresight Project (Vision 2023)	Ulusal Teknoloji Öngörü Projesi (Vizyon 2023)
Turkey	Turkish Science Policy, 1983-2003	Türk Bilim Politikasi, 1983-2003
Turkey	Research Foresight for Life Sciences and Technologies (Moleculer Scale)	Moleküler Yasam Bilim ve Teknolojileri Arastirma Ongörü Calismasi
United Kingdom	Cambridge Futures	Cambridge Futures
United Kingdom	Manchester City-Region 2020	Manchester City-Region 2020
United Kingdom	UK Technology Foresight Programme	UK Technology Foresight Programme
United Kingdom	West Midlands Regional Foresight	West Midlands Regional Foresight
United Kingdom	North East England regional foresight	North East England regional foresight
United Kingdom	UK Foresight Programme (Round 2)	UK Foresight Programme (Round 2)
United Kingdom	UK Foresight Programme (Round 3)	UK Foresight Programme (Round 3)

Annexe 2: Project Documentation

A2.1 Guidelines for completing the Activities Mapping DB

Table 1a: Background

Name of Exercise (in own language) and (in English)
What is the full name of the exercise, and what is it known as in English?

Exercise Web Address
If the exercise has a **web site**, what is its address?

Start Date
In what **year** did the exercise start?

Status
Is the exercise **completed** or is it still **ongoing** at this time? Answers should reflect **official** statements on the exercise.

Duration
For how long did the exercise last? This estimate should reflect **official** statements on the exercise.

Estimated Cost (€)
What is the estimated cost of the exercise in **Euro**? This figure should reflect the **official** budget of the exercise.

Territorial Scope
What is the territorial scope of the exercise? Is it **supranational**, i.e. EU-wide or covering at least two nation-states? Is it **national**, i.e. bounded by the national borders of a nation-state? Is it **sub-national regional**, i.e. covering the territorial organisation that lies immediately below the nation-state, e.g. NUTTS 2 regions, federal regions, etc.? Is it **sub-regional**, i.e. covering the territorial organisation that lies immediately below the region, e.g. city-regions, municipalities, etc.? Is it **inter-regional**, i.e. covering more than one sub-national region or sub-region? This option should also be selected where an exercise covers regions that transcend national borders.

Territory
What is the **name** of the territory being covered?

Sectoral/Thematic Scope
Does the exercise focus upon a **single** sector or theme? Or does it focus upon **multiple** sectors and/or themes?

Sector/Theme
If the exercise focuses upon a **single** sector or theme, specify what this is.
Hyperlink to 'List Sectors and Themes Covered' (T2)

Formal Objectives
What are the stated overall objectives of the exercise? These should be stated in full and should be based upon **official** statements on the exercise.

Rationales
What are the rationales being offered for conducting the exercise? Again, these should be based upon **official** statements on the exercise.

Table 1b: Foresight Barometer

Time Horizon
What is the **stated** time horizon of the exercise?

Approx. No. of Participants
How many people have been engaged in the exercise? This number should refer to (a) those individuals who are **intimately** tied to the conduct of the exercise, e.g. members of steering groups and expert panels; and (b) those individuals who might have been engaged more **loosely**, for example, as a participant in a scenario workshop or as a respondent to a Delphi questionnaire.

Diversity of Participants
What is the diversity in origin of the participants? Was it **wide**, i.e. involving groups of actors from a wide variety of organisation type, some of whom might not normally be consulted on the topic? Was it **narrow**, i.e. involving mostly those who would normally be consulted on the topic? Or was it **medium**, i.e. somewhere in between these two situations? Hyperlink to 'Origin of Participants' (T2)

Place of Formal Techniques
By formal techniques, we mean those methods that have been mostly borrowed from the forecasting and futures fields, such as Delphi, scenarios, cross-impact analysis, etc. A fuller list is given at the Hyperlink to 'Identifying Drivers'; 'Eliciting Wide Participation'; 'Presenting Future Developments' (T4b). Did exercise participants use such methods only as a **support for reflections**? Or were such methods a **founding basis of the exercise**, e.g. some of the Delphi exercises carried out at the national level? Where no such methods were used, you should select **none**.

Direct Action-orientation
Was the exercise simply **explorative**, with few or no stated links to public and/or private decision-making? Or was the exercise geared towards **vision-building**, with the aim of mobilising territorial and/or sectoral actors to arrive at a shared vision that could provide actionable goals? Or did the exercise explicitly set out to provide **inputs to strategic planning** within the public and/or private sectors? The main distinction between these last two options is that the former is more diffuse and distributed in its mode of action, whilst the latter is focused and more directed at the strategic planning practices of a single (or small number of) public or private organisation(s). The options

are 'accumulative', in that it is assumed that 'inputs to strategic planning' will require an exercise to be explorative and involve a modicum of 'vision-building'.
Hyperlink to T5 (Outputs and Outcomes)

Main Source of Finance
(Multiple Entries are possible)
Give the contact details of those organisations providing **financial** support to the exercise, and indicate a main contact person. Where possible, indicate the financial contribution (in **Euro**) of each organisation. If a sponsoring organisation is **unlikely to have a profile fiche** elsewhere in the database, then give details of its main business and, where appropriate, information on any other prospective activities in which it may have been involved. Otherwise, provide a Hyperlink to an Organisational Profile Fiche

Main Promoter
(Multiple Entries are possible)
Give the contact details of those organisations actively involved in **promoting** the exercise, and indicate a main contact person. Where possible, detail the actual contribution of each organisation. If a promoting organisation is **unlikely to have a profile fiche** elsewhere in the database, then give details of its main business and, where appropriate, information on any other prospective activities in which it may have been involved. Otherwise, provide a Hyperlink to an Organisational Profile Fiche

Table 2: Scope

Orientation and Coverage
What is the orientation of the exercise? Is it **science and technology**, where the exercise explicitly focuses upon identifying areas of new research and technological development? Does it focus on **business dynamics**, where the focus is on the opportunities and threats concerning business sector development? Is the orientation towards **socio-cultural** issues, such as youth culture, the media, leisure pursuits, etc.? Is it towards the development of a **territorial vision**, where a territory seeks to develop a collective vision of its development goals and trajectory? Does it focus on the **environment and sustainable development**, e.g. as part of an Agenda 21 implementation strategy? Note that exercises often have more than a single orientation, so multiple selections are allowed.

You should also list the sectors and themes **explicitly** covered by the exercise, e.g. through sub-groups and expert panels. Finally, a comment box is provided for elaboration on orientation and coverage.

Primary Target Audience
What is the primary target audience of the exercise? In other words, which groups does the exercise **explicitly** set out to inform and influence? Any elaboration should be provided in the comment box.

Secondary Target Audience
What is the secondary target audience of the exercise? In other words, which groups could the exercise **indirectly** inform and influence? Any elaboration should be provided in the comment box.

Breakdown in Number of Participants
How many individuals (full-time equivalents) from the **General Managing Organisation** and its partner organisations are working on the management of the exercise? How many experts and stakeholders are **intimately involved** in the exercise, e.g. as serving panel or sub-group members? How many individuals are **engaged more widely**, e.g. including those who have attended workshops, responded questionnaire surveys, etc. Any elaboration should be provided in the comment box.

Origin of Participants
From which **type of organisation** or community have exercise participants come? A distinction is made between those intimately involved in the conduct of the exercise, e.g. as panel members, and those who are engaged more widely, e.g. Delphi respondents. Any elaboration should be provided in the comment box.

Table 3: Organisation and Management

General Managing Organisation
What is the name and contact details of the organisation taking the lead in the general organisation and management of the exercise? What is the **status** of this general managing organisation? Is it **permanent**, i.e. a pre-existing organisation or one that has been set up to operate for the foreseeable future? Or is it **temporary**, i.e. an organisation with a fixed-term existence, specifically set up to manage the exercise? Is it **autonomous**, i.e. existing and operating independently of other organisations? Or is **composite**, i.e. drawing on and dependent upon the human and financial resources of other organisations? Hyperlinks to Organisational and Individual Profile fiches

Main Project Partners
(Multiple Entries are possible)
Who are the main project partners to the general managing organisation? Only **'process'** contributors should be mentioned here, such as experts and consultants who facilitate the management of the exercise. Hyperlinks to Organisational and Individual Profile fiches

Main Organisational Features
Describe the main organisational features of the exercise, e.g. does it have a steering group? Have expert panels been appointed? Has the exercise been divided into distinct phases? Etc.

Knowledge Management
Describe how knowledge flows are managed in the exercise, paying particular attention to (a) ways that knowledge is **transferred** horizontally between different parts of the exercise (especially important in large exercises with many panels, for example); and (b) ways that knowledge is **collated** from across the exercise and **synthesised**.

Links with other Foresight-related Activities
What links, if any, does the exercise have with other foresight-related activities? For example, does the exercise utilise any of the outputs from other foresight activities? Hyperlinks to external web sites where appropriate

Table 4a: Tasks and Methods (Pre-Foresight)

Raising Awareness of the Exercise
What methods, if any, were used to raise awareness of the **idea** of the exercise at the start? Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Scoping the Exercise
What approaches were used for scoping the exercise? By 'scoping', we mean the **processes** by which the time horizon, duration, organisation, coverage, costs, etc. of the exercise were debated and decided upon. Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Locating Experts
What approaches, if any, were used to locate experts for the exercise? By 'experts', we refer to those individuals with **professional** knowledge who **do not have a direct stake** in the outcomes of the exercise. For the purposes of this database, experts with a direct stake are considered to be 'stakeholders'. A distinction has been made between those intimately engaged in the exercise, e.g. as panel members, and those more loosely involved, e.g. as scenario workshop attendees. Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Locating Stakeholders
What approaches, if any, were used to locate stakeholders for the exercise? By 'stakeholders', we refer to those individuals with a **direct stake** in the outcomes of the exercise, irrespective of whether they can be considered 'expert' or 'lay'. A distinction has been made between those intimately engaged in the exercise, e.g. as panel members, and those more loosely involved, e.g. as scenario workshop attendees. Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Table 4b: Tasks and Methods (Main Foresight)

Raising Awareness of the Exercise
What methods, if any, were used to raise awareness of the exercise **during** its conduct? Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Gathering Background Information
What methods, if any, were used to gather background information for the exercise? By 'background information', we mean **statistics**, published **reports**, existing futures-type

studies, etc. Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Identifying Drivers and Perspectives
What methods, if any, were used to identify drivers and perspectives for the exercise? By 'drivers and perspectives', we mean those **trends, issues and world-views** that could have a significant bearing in the future. Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Eliciting Wide Participation
What methods, if any, were used to elicit wide participation in the exercise? In other words, how did the exercise seek to reach out to individuals and organisations **beyond those intimately engaged**? Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Presenting Future Developments
What methods, if any, were used to present future developments? Here, we are referring to things like scenarios, essays, and film that illustrate **possible future worlds** and that are used to **stimulate** thinking and debate within the exercise. Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Managing Diversity of Opinions and Integrating Views
What approaches, if any, were used to manage diversity of opinions? In other words, how were divergent views **accommodated within the process** of the exercise? Moreover, how were views integrated, if at all, for the purposes of **generating official outputs**? If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Defining Key Actions and Priorities
What methods, if any, were used to define key actions and priorities emerging from the exercise? By 'key actions and priorities', we mean the production of **recommendations for action** in light of the exercise's findings. Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Table 4c: Tasks and Methods (Post-Foresight)

Dissemination Activities
What approaches, if any, were followed in disseminating the **findings and outputs** of the exercise? Multiple tick-box selections are permitted, and any elaborations should be

provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Evaluation
What type of evaluation, if any, has been carried out of the exercise? By **output** evaluation, we mean an assessment of the quality of the exercise's outputs. **Process** evaluation refers to an assessment of the methodology used, whilst **impact** evaluation is concerned with the outcomes of the exercise. Output and process evaluation tend to be carried out in real-time or shortly after an exercise is completed, whilst impact evaluation usually occurs some time after the exercise has finished. Evaluation can be conducted **internally**, e.g. by the general managing organisation, or **externally**, e.g. directly by the sponsors or by a fully independent external team. Many foresight exercises are not evaluated at all, whilst in other situations, managers and sponsors rely upon informal feedback. Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box. If applicable, identify the name and affiliation of any lead players. Hyperlink to Organisational and Individual Profile Fiches

Table 5: Outputs and Outcomes

Nature of Formal Outputs
What **types** of outputs were produced by the exercise? Multiple tick-box selections are permitted, and any elaborations should be provided in the comment box.

List Publications & Web Resources
List any publications that have been produced. Where possible, indicate any web resources that are accessible, including documents that are available online. Hyperlinks to external web sites where appropriate

Expected Impacts
Describe those impacts of the exercise that were expected and **anticipated** by sponsors, managers and participants. In this regard, attention should be paid to the original **objectives and rationales** for the exercise, and consideration given to the reaction of the **target audience**. Soft outcomes, such as networking, should also be considered here. Hyperlinks to external web sites where appropriate

Unexpected Impacts
Describe those impacts of the exercise that were unexpected and **unanticipated** by sponsors, managers and participants. Soft outcomes, such as networking, should also be considered here. Hyperlinks to external web sites where appropriate

A2.2 Project Flier

European Science and Technology Observatory

ipts

AUSTRIAN RESEARCH CENTERS

Fondazione Rosselli

GROUPE futuribles

ISI
Institut Systemtechnik und Innovationsforschung

PREST

TNO

TÜBITAK

VDI

VITO

VTT

Euro-Foresight Mapping Project

Since the mid-1990s, Foresight has become increasingly prominent as a tool for informing policymaking. It is being used in a widening range of areas (from an initial focus on science and technology policies) and by a widening range of organisations. New Foresight initiatives are emerging to support policy formulation, network formation, and education and knowledge dissemination at many levels of territorial governance (national, regional, cities, etc.). Similar phenomena can also be observed at the sectoral level, where Foresight exercises are being initiated that focus upon business needs and concerns.

Yet, in spite of this rapid diffusion of the Foresight approach, there has been little effort to draw together accumulated experience, although this would no doubt benefit those planning to embark upon a Foresight exercise. This suggests a need for some initial mapping and perhaps ongoing monitoring of territorial and sectoral Foresight activities, especially since the field is in a constant state of flux.

With this in mind, the European Commission has recently asked the ESTO network to undertake a project to map Foresight **activities** across the EU15 and a selection of Pre-Accession Countries. Moreover, within the context of the emerging European Research Area, the project will also set out to map the **competencies** of those individuals and organisations actively engaged in organising and managing Foresight activities. This information is likely to be used by the European Commission and other policy makers, as well as those planning to undertake Foresight, when seeking to identify expertise in the Foresight area.

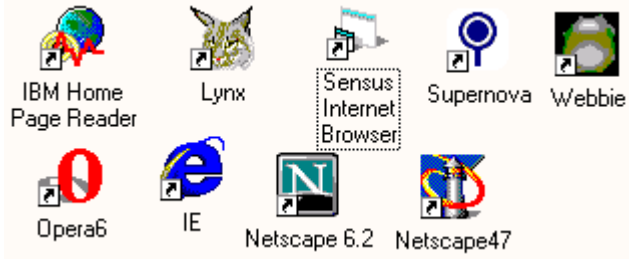
The project approach involves collecting data by web search, interviews, and questionnaires on ongoing and completed Foresight exercises. Data is also being collected similarly on organisational and individual competencies. In all cases, data gathering is guided by frameworks of indicators that have been constructed by the project partners. The collected data is being directly entered into a searchable web-based format, which should prove useful to both Foresight practitioners and policy makers alike.

For further information on this project, visit our web site at:

http://les1.man.ac.uk/eurofore/

A2.3 Accessibility

The database and web interface were designed with EU accessibility regulation in mind. The table below illustrates the database using a few different web browsers.

<table>
<tr><td colspan="2">For more information on screen readers and access technologies, visit :
http://fssl.man.ac.uk/enabled and http://fssl.man.ac.uk/enabled/readers</td></tr>
<tr><td>The site may be accessed by a variety of equipment ...</td><td> 
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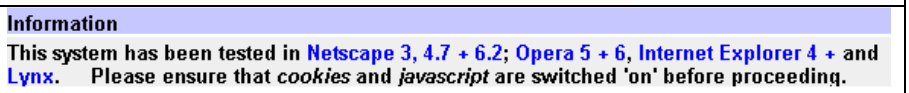
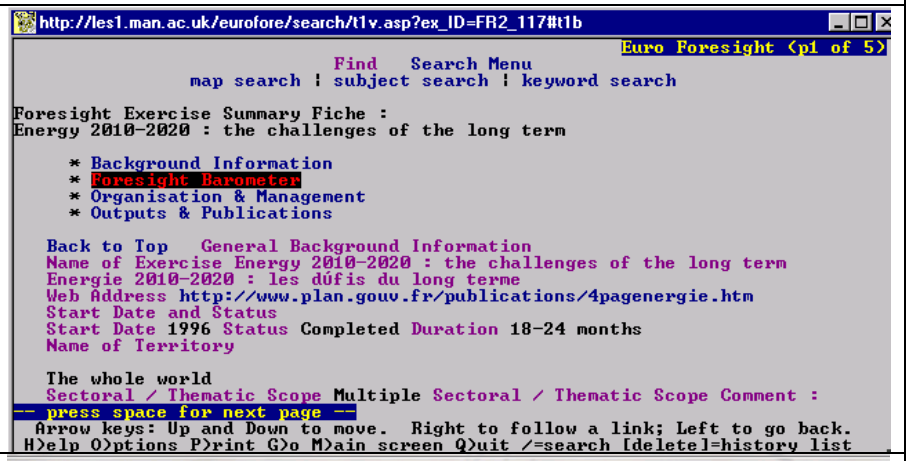
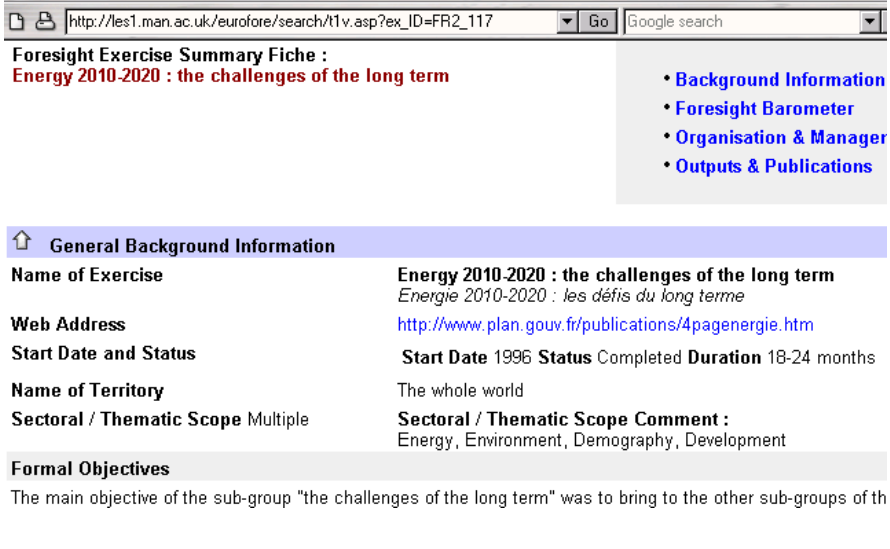
<tr><td>... designed with EU accessibility legislation in mind</td><td> 
</td></tr>
<tr><td>A foresight exercise summary fiche in Lynx, a browser popular with visually impaired people.</td><td> 
</td></tr>
<tr><td>The same foresight exercise in a graphical web browser, Opera.

The use of style sheets, simple table layout and ...

Accessibility matches other needs very well (speed, reliability over often slow, long distant connections), so did not take much time...</td><td> 
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